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WITH ABSTRACT OF THE LITERATURE

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THE JOURNAL OF INDUSTRIAL HYGIENE

VOLUME XIV DECEMBER, 1932 NUMBER 10

THE PNEUMONIA PROBLEM IN THE STEEL INDUSTRY*[1]

DEAN K. BRUNDAGE AND J. J. BLOOMFIELD

REPORTS of industrial sick-benefit associations to the United States Public Health Service have shown consistently higher incidence rates for pneumonia (all forms) among iron and steel workers than among the employees of other industries as a whole. For the period 1922 to 1928 inclusive, the pneumonia case rate in the steel industry was nearly 70 per cent. above the rate in the reporting public utilities, and approximately 50 per cent. higher than in all other reporting industries as a group. Among industrial workers one may expect an average pneumonia incidence rate of 2.5 to 3.0 cases per year per 1,000 men; in steel, the average rate in the period mentioned was 4.4 cases annually per 1,000 male members of the reporting sick-benefit associations. This result is the more striking on account of low morbidity rates for nearly all of the major causes of illness among steel workers, which is indicative of a favorable selection of men from a physical standpoint in the industry.

A query suggested by this experience is whether the high rate of cases among steel workers is reflected in an excessive mortality from pneumonia in iron and steel manufacturing centers. First thought is of Pittsburgh which for years has reported one of the worst death rates from pneumonia among the large cities of America.[2] Other steel manufacturing cities such as Youngstown, Johnstown, Gary, Braddock, Carnegie, Duquesne, and Pueblo also exhibit pneumonia death rates so greatly in excess of the average rate for the registration area of the United States as to leave little room for doubt about their significance.

* Received for publication July 20, 1932.

[1] A presentation of some of the results of a study of the frequency of pneumonia among iron and steel workers, made by the Office of Industrial Hygiene and Sanitation, United States Public Health Service in cooperation with a large steel company in Pennsylvania. The more detailed report is presented as Public Health Bulletin No. 202, in press.

[2] Cf. Mortality Rates, 1910–1920. Bureau of the Census, Department of Commerce. Government Printing Office, Washington, 1923, p. 108.

If the excess pneumonia incidence rate of 1.6 cases per year per 1,000 men[3] is applied to the number employed in blast furnaces, steel works, and rolling mills, one may estimate the yearly surfeit of sickness from this cause as about 685 cases.[4] Assuming that only 25 per cent. of the men attacked by pneumonia will die from it (the percentage was 31 in a large steel works studied), one finds an excess of 171 deaths from pneumonia annually in the industry. From the standpoint of number of lives destroyed, it is pertinent to say that only a few problems in industrial hygiene merit more urgent attention.

In England and Wales the Registrar-General's report on occupational mortality (1921–23) shows that "persons engaged in the smelting, rolling, and converting of iron and steel" experienced greater pneumonia mortality than all occupied and retired males, and more than the social groups in which the steel workers are classified. Employees having especially heavy mortality from pneumonia include blast furnace workers, puddlers, metal moulders, iron foundry furnacemen and laborers, gas stokers, and brass foundry furnacemen and laborers. Accordingly, it appears that our own country is not unique in respect to a pneumonia hazard in its steel industry.

TABLE 1.—FREQUENCY OF CASES OF PNEUMONIA (ALL FORMS) CAUSING DISABILITY FOR EIGHT CALENDAR DAYS OR LONGER AMONG THE MALE MEMBERS OF SICK BENEFIT ASSOCIATIONS REPORTING TO THE UNITED STATES PUBLIC HEALTH SERVICE, 1922 TO 1928, CLASSIFIED ACCORDING TO INDUSTRY

INDUSTRY	ANNUAL NUMBER OF CASES PER 1,000 MEN (IN TERMS OF YEARS OF LIFE OBSERVED)	NUMBER OF CASES OF PNEUMONIA	NUMBER OF YEARS OF LIFE OBSERVED[1]
Iron and steel	4.4	1,457	330,606
Public utilities	2.6	521	202,822
Other industries[2]	2.9	854	292,477

[1] Sum of the average number of members for each of the years included.

[2] A miscellaneous group; products include chemicals, abrasives, plumbing fixtures, electrical equipment, paper, paper novelties, timepieces, hats, underwear, flour, soap, and other articles of manufacture. During the five years 1924–1928, the pneumonia rate for this group was 3.0.

[3] The average pneumonia rate for all reporting companies except those in the steel industry in the period 1922 to 1928 inclusive was 2.8 cases annually per 1,000 men, which rate subtracted from 4.4 for the steel industry gives an excess incidence for the latter of 1.6 cases annually per 1,000 men.

[4] The Census of Manufactures shows 427,861 employed in blast furnaces, steel works, and rolling mills in the United States in 1927.

Respiratory Diseases by Departments of a Steel Plant

In studying the occurrence of pneumonia among steel workers which the Public Health Service did in cooperation with a large steel company

in Pennsylvania, recourse was made to the records of morbidity and death kept by the sick-benefit association of employees of the company.

The association pays cash benefits to members disabled on account of sickness or nonindustrial injury causing absence from work for more than one week, and a record of each case of a respiratory nature based on the attending physician's diagnosis which was a requirement for drawing benefits was obtained for the five years ending December 31, 1928. From the mortality records of the association it was possible to abstract also a list of cases of pneumonia which terminated fatally prior to the eighth day of disability. The average number of members of the association at the plant studied was 12,368 during the period 1924–1928 inclusive. The pneumonia rate for this group was about 35 per cent. above the average for all other reporting establishments in the industry, but was considerably below the rates found in at least two other large steel companies.

A tabulation of the cases showed an abnormal frequency of pneumonia in certain departments. The rates were unusually high in blast furnace, coke plant, open hearth, rod and wire mills, and in "General to mills." The last-named includes a large number of general laborers. Among men employed in the shops (steel car, plumbing, boiler, roll, and disc), and in the coal mines, the pneumonia rates exceeded the average for industrial workers, although not so markedly as in the other departments named. In each of these departments the frequency of influenza or grippe was definitely above the incidence recorded for all other departments as a group; and in open hearth and in "General to mills," bronchitis apparently occurred at excessive frequency. These rates constituted the basis for a detailed study of working conditions in the mills which might predispose to pneumonia or to certain other diseases of the respiratory system.

Factors Apart from Working Conditions

Since certain factors apart from the nature of the work and the working environment may affect the frequency of pneumonia, the more important of these require measurement and evaluation before considering the effects of work. Among such factors may be listed seasonal variation in frequency of the disease, influenza epidemics, economic status, age of the men, their nationality, extent of addiction to alcoholic stimulants, and prevalence of pneumonia in the community.

As regards seasonal variation, the pneumonia rate for the steel plant studied was higher each month with the exception of July and August than among the employees of other industries as a whole. The excess pneumonia among the steel workers was found to be *relatively* about as great at one time of the year as at another. The ratio of pneumonia to total influenza and pneumonia cases was remarkably constant in all but four months of the year. From November to June this percentage was approximately 20; in July and August it dropped to $12\frac{1}{2}$, but in September and October the proportion was the highest of the year (34 per cent.). The fatality rate (percentage of cases which terminated fatally) showed remark-

TABLE 2.—FREQUENCY OF SPECIFIED RESPIRATORY DISEASES BY DEPARTMENTS OF A STEEL PLANT, 1924–1928 INCLUSIVE

Male cases causing disability for more than one week

DEPARTMENTS	ALL RESPIRATORY DISEASES[3]	PNEUMONIA[3]	INFLUENZA AND GRIPPE	BRONCHITIS	TUBERCULOSIS	ASTHMA	DISEASES OF THE TONSILS	OTHER RESPIRATORY DISEASES
	Annual Number of Cases per 1,000 Men							
All departments	42.6	6.1	22.1	3.0	2.0	2.2	4.5	2.7
Blast furnace	59.4	14.0	34.5	*	*	*	*	*
General to mills[1]	66.0	10.8	35.6	4.8	*	*	5.6	4.3
Coke ovens	46.8	10.7	21.1	*	*	*	*	*
Open hearth	65.5	8.5	33.2	6.5	*	*	6.5	*
Rod and wire mills	42.7	7.4	22.8	*	*	*	*	*
Shops[2]	49.8	5.9	26.0	3.3	3.3	*	4.7	3.9
Coal mines	52.3	5.2	28.5	3.1	2.8	4.4	5.1	3.2
Railroad	36.5	*	24.3	*	*	*	*	*
Office	21.0	*	*	*	*	*	*	*
All other departments	28.5	3.8	13.7	2.0	1.3	1.3	4.3	2.1
	Percentage Excess over "All Other Departments"							
Blast furnace	108	268	152	*	*	*	*	*
General to mills[1]	132	184	160	140	*	*	30	105
Coke ovens	64	182	54	*	*	*	*	*
Open hearth	130	124	142	225	*	*	51	*
Rod and wire mills	50	95	66	*	*	*	*	*
Shops[2]	75	55	90	65	154	*	9	86
Coal mines	84	37	108	55	115	238	19	52
Railroad	28	*	77	*	*	*	*	*
Office	−26	*	*	*	*	*	*	*
	Number of Cases							
All departments	2,632	380	1,365	186	121	137	277	166
Blast furnace	153	36	89	9	5	3	8	3
General to mills[1]	426	70	230	31	12	19	36	28
Coke ovens	122	28	55	13	6	4	13	3
Open hearth	231	30	117	23	8	14	23	16
Rod and wire mills	116	20	62	10	7	5	6	6
Shops[2]	306	36	160	20	20	17	29	24
Coal mines	428	43	233	25	23	36	42	26
Railroad	66	11	44	1	0	4	4	2
Office	27	5	10	2	6	0	1	3
All other departments	757	101	365	52	34	35	115	55

Number of years of life under observation (sum of average number of members for each of the years included): Total 61,839; Blast furnace 2,578; General to mills[1] 6,457; Coke ovens 2,609; Open hearth 3,527; Rod and wire mills 2,720; Shops[2] 6,146; Coal mines 8,185; Railroad 1,808; Office 1,286; All other departments 26,523.

* Not computed when number of cases causing disability for more than one week was less than 20.

[1] Including General to Open Hearth Mills and General labor department.

[2] Steel car, Plumbing, Boiler, Roll, and Disc Shops.

[3] Including 51 pneumonia cases which died prior to the eighth day of disability.

ably little variation according to season, ranging from 26 to 31 per cent. except during July and August when the number of cases was really too small to afford reliable fatality rates.

Epidemic Influenza

In two of the sixty months of the study, e.g., March, 1925 and December, 1928, influenza and pneumonia occurred at epidemic frequency. These influenza epidemics hit the high-pneumonia-rate departments harder than the remainder of the plant, the frequency of pneumonia being 39 per cent. greater in this group of departments than in "all other departments." In the interepidemic months, when pneumonia in the plant as a whole occurred at about one-fifth of its epidemic frequency, the rate for these eight departments as a group was greater by 128 per cent. than in the remainder of the steel works.

A point of equal if not greater importance is that the excess of sickness in these departments was not confined to pneumonia alone. The rates were relatively just as high for influenza, and also for other respiratory diseases as a whole, in epidemic as well as in normal periods. We are dealing, therefore, not with a pneumonia problem only, but with a *respiratory disease problem.* On account of the seriousness of pneumonia, the present analysis is confined largely to this disease.

During the influenza epidemic

TABLE 3.—PNEUMONIA MORTALITY AND FATALITY RATES IN INFLUENZA EPIDEMIC AS COMPARED WITH INTEREPIDEMIC MONTHS, FOR EACH OF TWO GROUPS OF DEPARTMENTS IN A STEEL PLANT, 1924–1928 INCLUSIVE

GROUPS OF DEPARTMENTS	ANNUAL NUMBER OF DEATHS FROM PNEUMONIA PER 100,000 MEN DURING—		PERCENTAGE OF PNEUMONIA CASES WHICH TERMINATED FATALLY DURING—		NUMBER OF CASES OF PNEUMONIA (ALL FORMS) DURING—		NUMBER OF DEATHS FROM PNEUMONIA DURING—		NUMBER OF YEARS OF LIFE UNDER OBSERVATION IN—	
	Influenza Epidemic Months[2]	Interepidemic Months[3]	Influenza Epidemic Months[2]	Interepidemic Months[3]	Influenza Epidemic Months[2]	Interepidemic Months[3]	Influenza Epidemic Months[2]	Interepidemic Months[3]	Influenza Epidemic Months[2]	Interepidemic Months[3]
All departments, except office	852.7	167.7	33.3	30.5	54	321	18	98	2,111	58,442
Eight departments having high pneumonia case rates[1]	998.3	201.0	34.3	27.6	35	239	12	66	1,202	32,828
"All other departments"	660.1	124.9	31.6	39.0	19	82	6	32	909	25,614

[1] Blast furnace, "General to Mills," Coke ovens, Open hearth, Rod and wire mills, Shops, Coal mines, and Railroad.

[2] Months of March, 1925, and December, 1928.

[3] January, 1924 to November, 1928 inclusive except March, 1925.

months, deaths from pneumonia occurred at the rate of 998 per year per 100,000 men in the eight departments under scrutiny as compared with 660 in "all other departments." For the 58 interepidemic months the eight departments had a pneumonia death rate of 201 per year per 100,000 men, while the corresponding rate among men in the rest of the plant was

ing high pneumonia case rates than in the other departments as a group. But in the months free of epidemic (all forms) among both sexes includ- influenza, the fatality rate for the eight departments was definitely lower than among patients who were employees of the other departments. This does not signify that the disease occurred in mild form; a fatality rate

TABLE 4.—PNEUMONIA INCIDENCE, MORTALITY, AND FATALITY RATES BY AGE, AMONG MALE EMPLOYEES OF A STEEL COMPANY, 1924–1928 INCLUSIVE

AGE GROUPS	ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN[1]	ANNUAL NUMBER OF DEATHS FROM PNEUMONIA PER 1,000 MEN[1]	FATALITY RATE (PERCENTAGE OF CASES WHICH TERMINATED FATALLY)	NUMBER OF CASES OF PNEUMONIA	NUMBER OF DEATHS FROM PNEUMONIA	APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED
All ages	6.1	1.9	31.1	380	118	61,839
Under 25	5.2	1.1	21.8	55	12	10,623
25–34	5.2	1.0	18.3	82	15	15,678
35–44	6.2	2.0	32.7	107	35	17,394
45–54	5.1	1.7	34.5	58	20	11,445
55–64	8.2	4.5	54.5	44	24	5,358
65 and over	16.4	7.5	45.5	22	10	1,341
Age unknown	—	—	—	12	2	—

[1] In terms of number of years of life observed (sum of the average number of members of the sick-benefit organization for each of the years included).

125. In the registration area of Continental United States, the annual number of deaths from pneumonia ing the colored, at ages 15 to 65 was about 55 per 100,000 persons during the period of the study. The abnormal mortality in the steel group requires no comment; the contrast speaks for itself.

The fatality rate during the two epidemic months was slightly, although perhaps not significantly, greater in the departments experienc-

of 28 per cent. at the working ages of life is not low.

Age

The average frequency of pneumonia among male employees of all ages in a group of manufacturing establishments was approximately 3.0 cases per year per 1,000 persons during the five years covered by the sickness records of the steel workers. The pneumonia rate among the men in the steel plant who were less than 35

years of age was 5.2 cases annually per 1,000. Thus, at the most favorable ages of adult life, the frequency of pneumonia in the steel group was higher than the average rate for *all* ages among industrial workers generally. In the group specially observed, the incidence rates according to age showed no material increase up to the 55th year of life, but after this age they mounted rapidly to a rate of 16.4 at ages 65 and over.

The death rate from pneumonia rose more abruptly with age than the frequency of cases, on account of the higher fatality rate at the older ages. The percentage of cases which terminated fatally was about 20 at ages below 35, and approximately 33 per cent. at ages 35 to 55, after which about one-half of the cases ended in death.

Race

The question was raised by a representative of the steel company whether the excess pneumonia was due to racial predisposition to the disease on the part of the Mexican and colored employees of the company. Unfortunately, no basis was afforded for computing pneumonia rates by race or nationality in the absence of knowledge of the number of workers classified according to race for the five years of the study. However, certain rough estimates were possible in lieu of actual sickness rates. These showed that the excess was not confined to the racial groups mentioned. The Mexicans and colored did not even account entirely for the excess in specific departments such as the coke plant where the colored constituted a larger proportion of total workers than in the plant as a whole.

Alcoholism

It is possible, of course, that pneumonia may tend to occur oftener among persons heavily addicted to alcoholic stimulants than among moderate drinkers or abstainers. Unfortunately, there seemed to be no satisfactory way of evaluating the factor of alcoholism in the present study. The attraction of alcohol undoubtedly is immense among persons doing hot and disagreeable work, because the narcotic action of alcohol blunts the psychic sensitiveness to the discomforts of environment. Discomforts, however, are not encompassed within the walls of half a dozen departments. If alcoholism was an important factor in the incidence of pneumonia among the steel workers observed, it seems unlikely that the distribution of cases would be so largely concentrated in a few departments.

Prevalence of Pneumonia in the Community

The pneumonia rate of a group of the population obviously may be affected by the prevalence of the disease in the community. The frequency of cases occurring in the general population of the city was not available, but mortality statistics for ages 15 to 45 could be employed for this purpose. The death rate from pneumonia in the female population of the city at these ages was 56 per year per 100,000 during the four years ending December 31, 1927. In the registration states the rate for the same period was about 28. When the last-named

figure was adjusted for the higher pneumonia mortality generally found in cities, an estimate of about 34 deaths per year per 100,000 females was obtained for the age group 15 to 45. Therefore, the mortality from pneumonia among the women of the city in which the steel plant is located was above the average for American cities. Among the city's male population at these ages the pneumonia death rate was almost twice the female rate. Among employees of the steel work studied, the rate was higher than among males in the general population, but this is of little significance since more than one-half of the male population of the city at the ages mentioned was estimated to be engaged in the steel industry. More illuminating is the comparison with the mortality rate of the women. In certain departments of the steel plant studied, e.g., blast furnace, coke ovens, open hearth, coal mines, and general labor (considered as one group), the pneumonia death rate was 4.3 times that of women at the same ages in the city as a whole. There is little evidence, therefore, that community conditions were responsible for the high rate among the steel workers. On the contrary, the comparisons clearly indicate that the male pneumonia death rate of the community was increased appreciably by the prevalence of the disease among those engaged in certain processes of iron and steel manufacturing. Of course, many factors enter into the causation of such a widespread disease as pneumonia, and it should be emphasized that the implications of these statistics apply to the group as distinguished from the individual. Since the measurement is of necessity in terms of "excess" deaths, no basis exists for proving that any specific death from pneumonia was due to the conditions of steel manufacturing.

Economic Status

The known association of illness with poverty raises the question whether the pneumonia cases in the steel industry were concentrated among those receiving the lowest wages. It is essential from the standpoint of preventive medicine that one know the relative importance of economic condition and industrial environment as factors in the prevalence of the disease. In general, economic status usually connotes certain other influences such as living conditions and degree of intelligence so that it may be used as an index of several factors apart from working conditions.

Through the courtesy of the steel company, certain data on wages were obtained. The approximate annual earnings of men in specific occupations were reported according to three broad wage groups, and each occupation was classified according to the nature of the industrial exposure involved. Similarly, the cases of pneumonia were tabulated according to the annual earnings of the patients, and by kinds of exposure. As one might expect, the frequency of pneumonia tended to vary inversely with wages. The incidence rates were higher in the groups receiving less than $1500 per annum than among those earning more than this sum.

But these differences were not nearly so wide as the differences in the rates according to working conditions. The kinds of industrial exposure considered

were heat with wide changes in temperature, gases and smoke, dust, outdoor work in all kinds of weather, and strenuous labor. Men exposed to one or more of these conditions and who earned less than $1500 per year had an average annual pneumonia incidence rate of 15.5 cases per 1,000 as contrasted with a rate of 4.6 among those receiving the same wages but who worked under no appreciable exposure to any of the above-mentioned conditions. The latter group was small, however, being the equivalent of only 434 men under observation for one year among whom only 2 cases of pneumonia occurred. Considering the small number of men involved and the probable error of 2 (cases), one could not state with assurance that the results were significant. However, in the wage group $1500 to $2500, the odds were calculated as being about 19,000 to one against the occurrence of a difference in rates of the magnitude shown in Table 5 as the result solely of chance. Among those receiving more than $2500 per annum, the difference was wide, but the number under observation was too small to afford proof of a real difference in the frequency of pneumonia. Nevertheless, the point should not be ignored that the results were consistent in each of the three wage groups under consideration.

TABLE 5.—FREQUENCY OF PNEUMONIA AMONG IRON AND STEEL WORKERS EXPOSED TO CONDITIONS SPECIFIED, CLASSIFIED ACCORDING TO THE WORKERS' INCOME FROM WAGES. PERIOD 1924–1928 INCLUSIVE

KINDS OF EXPOSURE INVOLVED IN THE WORK	ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN WHOSE ANNUAL WAGES WERE—				NUMBER OF CASES OF PNEUMONIA AMONG MEN WHOSE ANNUAL WAGES WERE—			NUMBER OF YEARS OF LIFE OBSERVED AMONG MENAL WHOSE ANNU WAGES WERE—		
	All wage groups	Under $1500	$1500 to $2500	More than $2500	Under $1500	$1500 to $2500	More than $2500	Under $1500	$1500 to $2500	More than $2500
Exposure to one or more conditions[1]	12.1	15.5	10.2	12.6	79	98	9	5,101	9,582	716
Exposure to weather only	13.6	17.6	7.3	0	70	18	0	3,973	2,473	36
No exposure[2]	3.9	4.6	3.8	3.8	2	10	2	434	2,661	521

[1] The conditions were one or more of the following: heat with wide temperature changes, gases and smoke, dust, outdoor work in all kinds of weather, and strenuous labor.

[2] No appreciable exposure to any of the above-mentioned conditions.

Incidence of Pneumonia in relation to the Nature of the Work and Working Conditions in Certain Departments

The character of the work and the nature of any industrial exposure that might predispose to pneumonia were observed by Bloomfield in several departments of the steel works studied.

Each occupation was classified according to the extent to which the men were exposed to: (a) heat with wide temperature changes; (b) strenuous work; (c) outdoor work in all kinds of weather; (d) gases and smoke; and (e) dust. Extent of exposure was recorded in one of three categories, i.e., either no exposure, slight or occasional exposure, or heavy exposure. These classifications were made after the duties and activities of individual employees had been observed, and supplemental information obtained from foremen.

In the tables which follow the number of cases of pneumonia is shown in comparison with the number expected from the frequency experienced in the control group, the "all other departments" of Table 2. The concentration of the excess cases in a relatively few occupations is particularly noteworthy.

The number of "years of life observed" represents the average number of men engaged in the occupation multiplied by five to cover the five years of the study. The average number in each occupation is an estimate based on the number employed at certain times during the five-year period. To this extent the pneumonia rates are approximations; nevertheless, they are probably reasonably accurate because the margin of error in the estimated population appeared to be relatively small.

a. Blast Furnace

The pneumonia rate among blast furnace employees was higher than in any other department. The cases were not evenly distributed throughout the department, but were concentrated in a few occupations, practically all occurring either among the general laborers or among men in occupations associated with stacks and stoves (casting), especially among the first and second helpers.

The stacks and stoves (casting section) is concerned with the making of pig iron, and the maintenance of the machinery in connection with the operation of the blast furnace. The cast house keepers and helpers were observed as being exposed to heat with extreme variations in temperature, to gases and smoke, and, to some extent, to dust, and to inclement weather. The work is strenuous. When the molten iron flows down the trough to the ladles, these men are exposed to radiant energy of about 2.57 gram calories per square centimeter per minute. This intensity is severe enough to cause profuse sweating in a few minutes even under intermittent exposure and under winter conditions. A conception of the meaning of the magnitude of 2.57 gram calories per square centimeter per minute may be obtained when stated as the equivalent of the radiation from 128 Mazda C lamps (200 watts each) at a distance of three feet. This group experienced 13 times as many pneumonia cases as were to be expected from the rate of the control group in the plant. The other occupations of the casting section, i.e., blowers, hot blast men, and stove cleaners involve less exposure to extreme changes in temperature, as shown in Table 6. Their pneumonia rate was only 4 times the frequency experienced by the "all other departments" group in Table 2.

The general labor section serves as a clean-up force around the yard, and the work of the laborers in the car dumper section consisted of handling the incoming materials such as limestone, coke, iron ore, baked flue dust, from a pneumonia standpoint was continuance of outdoor work during storms and other periods of inclement weather. Pneumonia occurred in this group at about 7 times the expected frequency.

TABLE 6—FREQUENCY OF PNEUMONIA ACCORDING TO OCCUPATION, AND IN RELATION TO THE NATURE OF INDUSTRIAL EXPOSURE INVOLVED IN THE BLAST FURNACE DEPARTMENT, 1924–1928

SECTIONS AND OCCUPATIONS	NATURE AND EXTENT OF INDUSTRIAL EXPOSURE[1]					ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN	NUMBER OF CASES OF PNEUMONIA		APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED
	Heat with Wide Changes in Temperature	Strenuous Work	Outdoor Work in All Kinds of Weather	Gases and Smoke	Dust		Actual	Expected[2]	
All sections	—	—	—	—	—	14.0	36	10	2,578
Stacks and stoves (casting section)	—	—	—	—	—	27.2	17	2	624
Keepers	**	**	*	**	*	*8.3*	*1*	*0*	*120*
First and second helpers	**	**	*	**	*	*41.5*	*12*	*1*	*289*
Blowers	*	0	*	*	0	*0*	*0*	*0*	*52*
Hot blast men	*	*	**	**	*	*16.7*	*2*	*1*	*120*
Stove cleaners	*	*	**	**	**	*46.5*	*2*	*0*	*43*
General labor section and car dumper laborers	0	0	**	0	0	30.7	15	2	489
All other sections[3]	*	*	*	*	*	2.7	4	6	1,465

[1] Symbols for extent of exposure: 0, no exposure; *, slight or occasional exposure; **, heavy exposure.

[2] Number expected from the rate per 1,000 men in "all other departments" in Table 2.

[3] Eight per cent of the men heavily exposed, 23 per cent, slightly or occasionally exposed to heat with wide temperature changes. To strenous work, no one was heavily exposed, and only 5 per cent. had occasionally to work strenuously. To outdoor work in all kinds of weather, about 8 per cent. of the men were heavily exposed, 80 per cent. slightly or occasionally exposed. To gases and smoke about 5 per cent. were heavily, and 25 per cent. slightly or occasionally exposed. About 1 per cent. of the men were heavily exposed to dust, and about 55 per cent. slightly or occasionally exposed.

and open hearth cinders. The work was all performed out-of-doors, and was continued regardless of the state of the weather. In this section the only working condition which appeared to involve a potential hazard

b. Coke Plant

In the coke plant high pneumonia rates occurred among the general laborers and among those employed in the oven section. The coke ovens

are not enclosed in a building; hence the men are considerably exposed to weather conditions. While the worker's face may be subjected to the heat of the ovens, his back may be exposed to a penetrating wind or rain. The maximum temperature recorded was 110.8 degrees Fahrenheit for the left cheek of a coke oven heater working at 94 degrees Fahrenheit, relative humidity 24 per cent., and air velocity of 250 feet per minute. The effective

TABLE 7.—FREQUENCY OF PNEUMONIA ACCORDING TO OCCUPATION, AND IN RELATION TO THE NATURE OF THE INDUSTRIAL EXPOSURE INVOLVED IN THE COKE PLANT, 1924–1928

SECTIONS AND OCCUPATIONS	NATURE AND EXTENT OF INDUSTRIAL EXPOSURE[1]					ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN	NUMBER OF CASES OF PNEUMONIA		APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED
	Heat with Wide Changes in Temperature	Strenuous Work	Outdoor Work in All Kinds of Weather	Gases and Smoke	Dust		Actual	Expected[2]	
All sections	—	—	—	—	—	10.7	28	10	2,609
Oven section	—	—	—	—	—	11.2	15	5	1,344
Larrymen, lidmen, etc.[3]	**	*	**	**	**	*8.4*	*6*	*3*	*716*
Lutermen	**	**	**	**	**	*24.5*	*8*	*1*	*327*
Others[4]	0	0	*	0	*	*3.3*	*1*	*1*	*301*
Screenmen (coke screening)	0	0	0	0	**	76.9	4	0	52
General labor including coal handling, conveying, and crushing	0	0	**	0	**	12.3	6	2	487
All other sections[5]	*	*	*	*	*	4.1	3	3	726

[1] Symbols for extent of exposure: 0, no exposure; *, slight or occasional exposure; **, heavy exposure.

[2] Numbers expected from the rate per 1,000 men in "all other departments" in Table 2.

[3] Also Larrymen's helpers, standpipe men, door machine operators, pusher operators, coke oven heaters and helpers, and tar chasers.

[4] Quencher operators, brakemen, mud mixers, oven laborers, and foremen.

[5] About 40 per cent. slightly or occasionally exposed to heat with wide changes in temperature. About 6 per cent. heavily, and 25 per cent. slightly or occasionally exposed to strenuous labor. To outdoor work in all kinds of weather, about 27 per cent. were heavily exposed, and about 25 per cent. slightly or occasionally exposed. To gases and smoke, and to dust, about 40 per cent. of the men were slightly or occasionally exposed.

As an index of physical reaction to radiant energy exposure, a number of skin temperature readings were taken.[5] temperature was 79 degrees Fahrenheit. Exposure to radiant energy was 0.30 gram calories per square centi-

[5] For a description of the instruments used to measure skin temperature and radiation, cf. Bloomfield, J. J., et al. Effect of Radiant Energy on the Skin Temperatures of a Group of Steel Workers. Public Health Reports, vol. 45, No. 18, May 2, 1930 (Reprint No. 1370). Government Printing Office, Washington, D. C.

meter per minute. When the oven heater shifted to another part of the Oven section he was exposed to a temperature of only 56 degrees Fahrenheit. Here his skin temperature was found to be only 75.5 degrees F., a decrease of 35 degrees.

TABLE 8.—FREQUENCY OF PNEUMONIA ACCORDING TO OCCUPATION, AND IN RELATION TO THE NATURE OF THE INDUSTRIAL EXPOSURE IN THE OPEN HEARTH DEPARTMENT, INCLUDING GENERAL LABOR TO OPEN HEARTH AND MILLS, 1924–1928

SECTIONS AND OCCUPATIONS	NATURE AND EXTENT OF INDUSTRIAL EXPOSURE[1]					ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN	NUMBER OF CASES OF PNEUMONIA		APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED[3]
	Heat with Wide Changes in Temperature	Strenuous Work	Outdoor-Work in All Kinds of Weather	Gases and Smoke	Dust		Actual	Expected[2]	
All sections	—	—	—	—	—	7.5	42	21	5,625
General labor	0	0	**	0	0	14.5	16	4	1,102
Mechanical repairs	*	0	*	0	0	13.8	7	2	508
Furnace section	—	—	—	—	—	6.1	12	7	1,959
First, 2nd, 3rd helpers	**	**	0	0	*	*6.9*	*7*	*4*	*1,020*
Others[4]	*	0	*	*	*	*5.3*	*5*	*3*	*939*
Other sections[5]	*	0	*	*	*	3.4	7	8	2,056

[1] Symbols for extent of exposure: 0, no exposure; *, slight or occasional exposure; **, heavy exposure.

[2] Number expected from the rate per 1,000 men in "all other departments" in Table 2.

[3] The total number of years of life observed differs from that shown in Table 2 on account of the inclusion of general labor to mills in the above table.

[4] Ladle cranemen, melting foremen, nozzle setters and helpers, steel pourers, and steel pourers' helpers (pitmen); also charging machine operators, charging cranemen, stopper makers and helpers, ladle liners and helpers, sinkhead men, mould cleaners, clean-up laborers, and cindermen.

[5] About 10 per cent. heavily exposed, 5 per cent. slightly or occasionally exposed to heat with wide temperature changes. Nearly one-half heavily exposed to outdoor work in all kinds of weather; 5 per cent. slightly or occasionally exposed. About 15 per cent. were heavily exposed to gases and smoke. To dust, about 10 per cent. were heavily, and 15 per cent. slightly or occasionally exposed.

c. Open Hearth

The general laborers experienced the highest frequency of pneumonia of any occupational group in the open hearth department. Outdoor work in all kinds of weather appeared to be the only unfavorable working condition to which they were subjected.

The next highest rate was experienced by the mechanical repair section. These men are exposed occasionally to heat with wide changes in temperature, and also to outdoor work during inclement weather, but because the

group is a small one, the pneumonia rate is subject to considerable variation due to chance.

The third group having a high pneumonia rate was composed of men in the furnace section. About one-half of these men are designated as helpers. They perform hard work under trying conditions, their exposure to radiant energy being very great, although intermittent. Other occupations in the furnace section involve some exposure to heat, but not of the intensity experienced by the helpers, and their pneumonia rate was not quite so high.

Among men in the remainder of the Open hearth department where the exposures (described in footnote 5 of Table 8) tended to be milder, the pneumonia rate was only 3.4.

d. Open Hearth Mills (Blooming, Billet and Slab, and Plate)

The open hearth mills are of particular interest for several reasons. The majority working therein are of native stock (white). The work requires considerable skill; accordingly, wages are higher, and the men probably live under more hygienic conditions than do most of the workers in the other departments being considered in detail. The open hearth mills are enclosed so that no exposure to inclement weather is involved except in a few occupations. Although a number of the men are exposed to heat, the temperature range is not so wide, and the work is generally less strenuous than in the other departments described above. While the exposure to radiant energy was in certain instances greater than elsewhere, the duration of such exposure tended to be shorter. For example, a bottom maker in the soaking pit section was found to be exposed to 5.97 gram calories of radiant energy per square centimeter per minute, but only for brief periods. The skin temperature of bottom makers was found to fluctuate less than that of certain blast furnace and coke plant workers.

Among the men in the open hearth mills as a whole there was great irregularity in the occurrence of pneumonia. About 60 per cent. of the cases in the five year period occurred in the last year of the study, 1928. Only 21 per cent. of total cases, however, began in December, 1928, the first month of the influenza epidemic of 1928–29 in the community in which the steel plant is located. The cases occurring in that month were fairly well scattered throughout the sections under consideration so that the relative position of none of the groups shown in Table 9 was affected by the epidemic.

In the heating furnaces and soaking pit section which shows a pneumonia rate of 11.3, the men in practically all the occupations are exposed to radiant energy. In the mill sections (pneumonia rate 12.7), the occupations involving considerable exposure to radiant energy were those of roller, shearman and helpers, and hooker. These occupations contained one-fifth of the men among whom one-half of the pneumonia cases occurred.

The environment of the chippers differed from that of men in other occupations. The chippers remove surface defects from billets and blooms of steel by means of pneumatically activated chisels. The men kneel on the earthen floor of an open, shed-like

enclosure housing the chipping yard. The air in the sheds is made damp, and clothing frequently becomes wet from compressed air escaping from the pneumatic hammers used by the men. The sheds are draughty, and the work of manipulating a heavy compressed air tool is fatiguing. Fifteen cases of pneumonia occurred among the chippers in contrast with an expectancy of four cases.

e. General Labor

The General labor department which details laborers to departments not requiring this type of work continuously, experienced 13.8 cases annually per 1,000 men in contrast with a rate of 3.8 in the control group. Thus a high frequency of pneumonia was encountered in the general labor department as well as in the general labor section of each one of several departments.

Upon separating the individuals in the general labor departments into two groups according to extent of exposure to weather conditions, it was found that those heavily exposed to natural elements had an annual pneu-

TABLE 9.—FREQUENCY OF PNEUMONIA ACCORDING TO OCCUPATION OR SECTION, AND IN RELATION TO THE NATURE OF THE INDUSTRIAL EXPOSURE IN THE OPEN HEARTH MILLS (BLOOMING, BILLET AND SLAB, AND PLATE MILLS), 1924–1928

SECTIONS AND OCCUPATIONS	NATURE AND EXTENT OF INDUSTRIAL EXPOSURE[1]					ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN	NUMBER OF CASES OF PNEUMONIA		APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED
	Heat with Wide Changes in Temperature	Strenuous Work	Outdoor Work in All Kinds of Weather	Gases and Smoke	Dust		Actual	Expected[2]	
All sections	—	—	—	—	—	11.0	42	14	3,820
Heating furnaces and soaking pits[3]	*	*	0	*	0	11.3	4	1	355
Mill sections[4]	*	*	0	0	0	12.7	13	4	1,020
Chippers (chipping section)	0	**	*	0	0	13.9	15	4	1,080
All other sections[5]	*	*	*	*	*	7.3	10	5	1,365

[1] Symbols for extent of exposure: 0, no exposure; *, slight or occasional exposure; **, heavy exposure.

[2] Number expected from the rate per 1,000 among men in "all other departments" in Table 2.

[3] Work of the bottom makers and helpers (13 per cent. of the men in this group) considered somewhat strenuous.

[4] Work of the shearmen and helpers, levermen, scrap and product men, and hooker (about 30 per cent. of the men in this group) considered somewhat strenuous.

[5] About 35 per cent. occasionally or slightly exposed to heat with wide changes in temperature; about 15 per cent. occasionally or slightly exposed to strenuous labor; about 20 per cent. occasionally or slightly exposed to natural elements, and to gases and smoke; and 18 per cent. to dust.

monia rate of 15.2 cases per 1,000 men, while a small group with slight, occasional, or no exposure experienced complete freedom from pneumonia.

f. Coal Mines

Among the coal miners employed by the steel company, the pneumonia rate was 5.3. For all occupations of coal mining except pick mining and loading, the rate was 2.4. Pick miners and loaders experienced a rate of 6.8 cases annually per 1,000 men. They are exposed about six to seven hours a day to heavy concentrations of carbon dust. In addition, the active work of the miner causes heating of the body followed by sudden cooling while the men wait for empty cars. Sudden chilling may occur also when the men emerge from the uniform temperature of the mines into wintry conditions above ground. A number of miners go home wearing the damp clothes they have worked in. Besides subjection to sudden, sharp decreases in temperature, the miners' exposure to carbon dust cannot be excluded as a possible predisposing factor.

Incidence of Pneumonia According to Kind of Industrial Exposure

Certain occupations in the steel industry have been shown to be associated with an unusual frequency of pneumonia; there remain to be evaluated the kinds of industrial exposure which may constitute pneumonia hazards.

A major difficulty in attempting such an appraisal arises from the fact that a very small number of men were subjected to just one condition without significant degrees of other kinds of industrial exposure. One could not obtain a reliable pneumonia incidence rate for persons exposed only to gases and smoke, to dust alone, and to strenuous labor without other complicating deleterious conditions. The rate could be computed, however, for men obliged to work out-of-doors during inclement weather, and for those subjected to heat with wide changes in temperature without significant exposure to any other kind of industrial health hazard. The frequency of pneumonia in these two groups was 13.6 and 12.6 respectively, in contrast with a rate of 3.9 cases annually per 1,000 exposed to none of the working conditions under scrutiny. The exposed groups include men slightly or occasionally, as well as those heavily exposed, because considerable allowance should be made for variation in the reaction of different individuals to their working conditions. A somewhat lower rate, 10.6, was found among those exposed to one or more of the conditions under study, but exclusive of exposure only to inclement weather and only to a heat hazard.

Dust

Aside from the coal miners there were only 259 persons (in terms of number of years of life under observation) who were exposed to dust alone. In this group six cases of pneumonia occurred, yielding a rate of 23.2 in contrast with 3.9 among men in the plant who were not exposed to any industrial condition regarded as hazardous from a pneumonia standpoint. The difference in these two rates was 19.3, and the probable error of the difference was 6.4. The disparity in pneumonia frequency was,

therefore, only three times the probable error of the difference, and hence may have been due to chance fluctuation incident to the small numbers involved.

Gases

From measurements taken of gas concentration in the atmosphere of the steel plant under study, it appeared that the only gas present in sufficient concentrations to be of physiological significance was sulphur dioxide. Carbon monoxide and hydrogen sulphide were found in concentrations generally considered insufficient to produce physiological symptoms for such intermittent exposure as was experienced by the workers. No one was exposed to any of these gases without being subjected to other possibly hazardous conditions; thus the effect, if any, of these gases upon the incidence of pneumonia could not be evaluated apart from the other industrial conditions under discussion.

Natural Elements

A group of approximately 1,300 men (6,482 years of life from 1924 to 1928) performed work which necessitated exposure to all sorts of weather. Excluded from this group were men who worked out-of-doors, but who could seek shelter during inclement weather. No other kind of occupational exposure appeared to be involved. The pneumonia rate of this group was 13.6. The odds were calculated as being several millions to one against the occurrence of such a wide deviation from the normal pneumonia rate as the result merely of chance phenomena incident to small numbers.

TABLE 10.—FREQUENCY OF PNEUMONIA ACCORDING TO NATURE OF EXPOSURE IN A STEEL PLANT, 1924–1928[1]

INDUSTRIAL EXPOSURE[2] TO—	ANNUAL NUMBER OF CASES OF PNEUMONIA PER 1,000 MEN	NUMBER OF CASES OF PNEUMONIA	APPROXIMATE NUMBER OF YEARS OF LIFE OBSERVED
One or more conditions[3]	12.1	186	15,399
None of these conditions[3]	3.9	14	3,616
Inclement weather only	13.6	88	6,482
Heat with wide changes in temperature (no other hazard)	12.6	20	1,587
Other conditions[4]	10.6	78	7,330

[1] Employees of the mines omitted as well as those in departments in which no observations were made.

[2] Includes slight or occasional as well as heavy exposure.

[3] Conditions are: outdoor work in all kinds of weather, exposure to heat with wide changes in temperature, strenuous labor, dust, gases and smoke.

[4] Exposure to one or more of the conditions named in footnote 3, but exclusive of exposure only to inclement weather, and only to heat with wide changes in temperature.

Heat with Wide Changes in Temperature

The rate of 12.6 among men sub-

jected to high temperatures with wide changes in temperature without other kinds of occupational exposure was found to be statistically significant.

Corroboratory Evidence

The excessive mortality from pneumonia in certain occupations of the steel industry in England seems corroboratory of our morbidity findings in regard to the consequences of heat hazards.

From a study of pneumonia incidence in the jail population and in the armies of India, Rogers[6] found that the frequency of the disease among these groups in the northwestern part was five to ten times that found in the warm, moist areas of southern and eastern India. The northwest provinces were described as having low minimum temperatures combined with a remarkably wide diurnal variation in temperature, and cold northerly winds so that rapid cooling resulted through evaporation of any moisture on the skin. In the cold of early morning the Indians customarily wash in the open, clothed only in their thin cotton loin cloths which are allowed to dry on them. The author states also that the relationship of pneumonia to great diurnal variations of temperature with a low minimum accords with the experience of Egypt where the pneumonia death rate is very high. It is characteristic of many parts of Egypt for the temperature to fall very rapidly after sundown.

Among persons in these regions as well as among steel workers intermittently exposed to extremely high temperatures, to unsheltered work in the open, and to humid, draughty conditions, and wet clothing such as was found in the chipping sheds, a factor in common appears to be that of sudden cooling or chilling of the body as an incident of greater frequency than occurs among persons not subjected to such conditions. Among those exposed to precipitation, chilling may result from evaporation of moisture from the clothing, the heat required to effect the evaporation being absorbed from the body.

[6] Rogers, Sir Leonard. Relationship Between Pneumonia Incidence and Climate in India. The Lancet (London), for June 6, 1925.

Summary

Reports from a group of industrial sick-benefit associations to the United States Public Health Service have consistently shown a higher incidence rate of pneumonia among employees of the iron and steel industry than in other industries as a whole. Occupational mortality statistics for England and Wales reveal an excessive death rate from pneumonia in certain occupations of Britain's steel industry.

Factors apart from working conditions, such as seasonal variation in the frequency of pneumonia, influenza epidemics, economic status of the workers, their age, nationality, extent of addiction to alcoholic stimulants, and prevalence of the disease in the community selected for study of the pneumonia problem were analyzed, and found of insufficient influence to account for the high rate among the steel workers.

A study of working conditions in a large steel plant with special reference to the occurrence of pneumonia showed that the disease was associated with exposure to heat hazards when

subjection to wide changes in temperature was involved; also with outdoor exposure to storms and other inclement weather conditions, and with indoor exposure to humid, draughty conditions and wet clothing. Sudden cooling or chilling of the body was indicated as an important predisposing factor.

Recommendations

Among the remedial measures which suggest themselves, several are presented for consideration.

1. Mechanical devices to reduce the effective temperature in occupations involving exposure to radiant energy. A discussion of practical methods that have been applied in steel and other industries is given by Yaglou and Miller in a paper on industrial ventilation.[7]

2. Extension of the mechanization of processes involving heat hazards will doubtless tend to reduce the frequency and intensity of the workers' exposure.

3. Adequate provision for change houses for employees exposed to the conditions which appear to predispose to respiratory diseases, and compulsory use of such houses are indicated. Men perspiring freely after a bout of heavy work in front of the open hearth furnaces were observed changing clothes while standing in a direct draft; others went home without changing their clothes even though they had become wet from perspiration.

4. Shelters appear to be needed in stormy weather by those who work out-of-doors.

5. Reduction of hours of work through the stagger system or some other plan, and the prohibition of double shift duty, especially during the winter months, in pneumonia-hazardous occupations would doubtless prevent the development of a number of cases of the disease.

6. In line with the development of education in industrial safety as conducted by the steel industry, furtherance of health education of employees appears to be an important weapon in combating pneumonia. Employees should be instructed as to the danger of sudden chilling due to comparative inactivity following exposure to high temperatures, and the importance of suitable protective clothing.

7. A visiting nursing service functioning preferably as part of the employee sick-benefit organization to instruct the patient and help arrange for adequate medical and nursing care while pneumonia (or any other disease) is still in its incipiency should reduce mortality and shorten the duration of non-fatal cases.

8. The effectiveness of measures taken to diminish the incidence of pneumonia should be gauged by means of sickness and mortality rates covering, preferably, a five-year period, and so tabulated as to reveal the effect of influenza epidemics that may have occurred in the period under review.

[7] Yaglou, C. P., and Miller, W. E. Effective Temperature Applied to Industrial Ventilation. Jour. Am. Soc. of Heating and Ventilating Engineers, Vol. 30, No. 7, July, 1924.

ALTERNATING CURRENT PRECIPITATORS FOR SANITARY AIR ANALYSIS

I. AN INEXPENSIVE PRECIPITATOR UNIT*

PHILIP DRINKER

II. ACID FORMATION IN ELECTRIC PRECIPITATORS*

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IN THE United States the impinger method is used today for most dust determinations (1, 2). There are, however, many problems in which electric precipitation is to be preferred. The purpose of these two papers is to make available to others a miscellaneous assortment of practical information we have accumulated through constant use of precipitators over some ten years.

Since the publication of papers (3) describing laboratory-sized electric precipitators for determining dusts, fumes, and smokes in air, we have been asked frequently to develop an apparatus which would be inexpensive and reasonable in weight (Figure 1). In the past the necessary equipment, suitably boxed and calibrated for field use, cost and weighed too much to permit extensive usage.

I. AN INEXPENSIVE UNIT

Heretofore, the most expensive item has been the high-voltage transformer. We have used various modifications of 20,000 volt continuous duty apparatus costing about $300. At the suggestion of Mr. W. P. Yant,[1] we tried recently and found satisfactory a General Electric Company "luminous-tube transformer," intended for operating neon signs. This unit today costs $8.00, weights 32 pounds, operates from the 110 volt 60 cycle line, and furnishes a secondary current of 30 milliamperes at 15,000 volts. By means of a rheostat in the primary, one obtains readily voltages over a range such as 8000 to 15,000. The midpoint of the high voltage winding is grounded to the metal casing of the transformer.

For precipitating dry, poorly conducting suspensions, like most dusts of hygienic significance, non-rectified alternating current is preferred to rectified current. (3) This fact simplifies considerably the equipment as no rectifier, valve or mechanical, is needed. Precipitator tubes are best made of Pyrex of the size and shape dictated by the problem. In Figures 2a and 2b are shown two types we find satisfactory. The larger tube, Figure 2a, is used in miscellaneous dust sampling at 15,000 volts; the smaller tube, Figure 2b, is

* Received for publication November 1, 1932.

[1] Superintendent, Pittsburgh Experiment Station, U. S. Bureau of Mines.

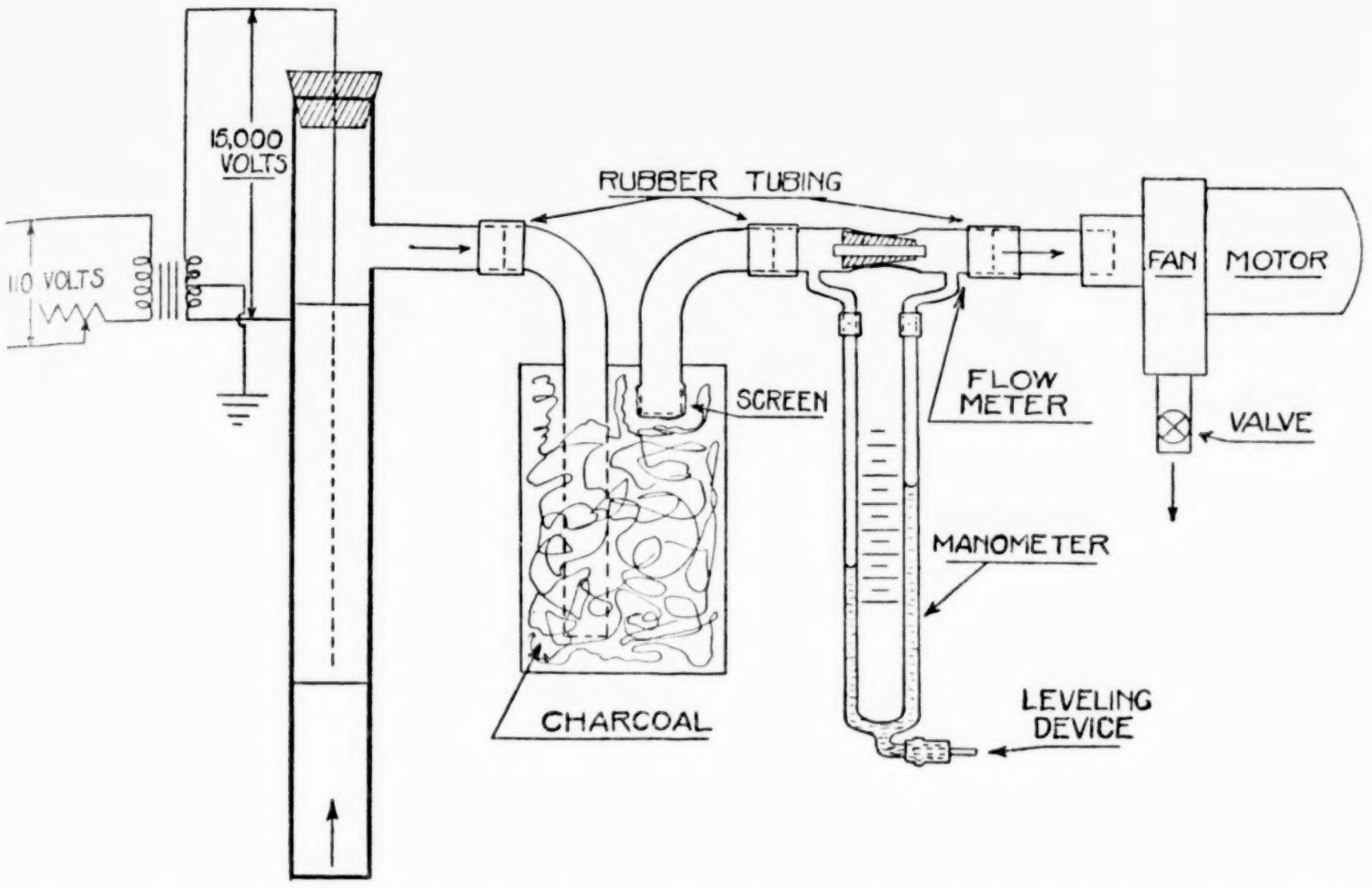

FIG. 1. General scheme showing 3 cm. diameter open end precipitator tube. The charcoal container reduces but does not eliminate damage to rubber stoppers and tubing. Precipitator tube can be supported at outer end of side arm by laboratory stand and clamp.

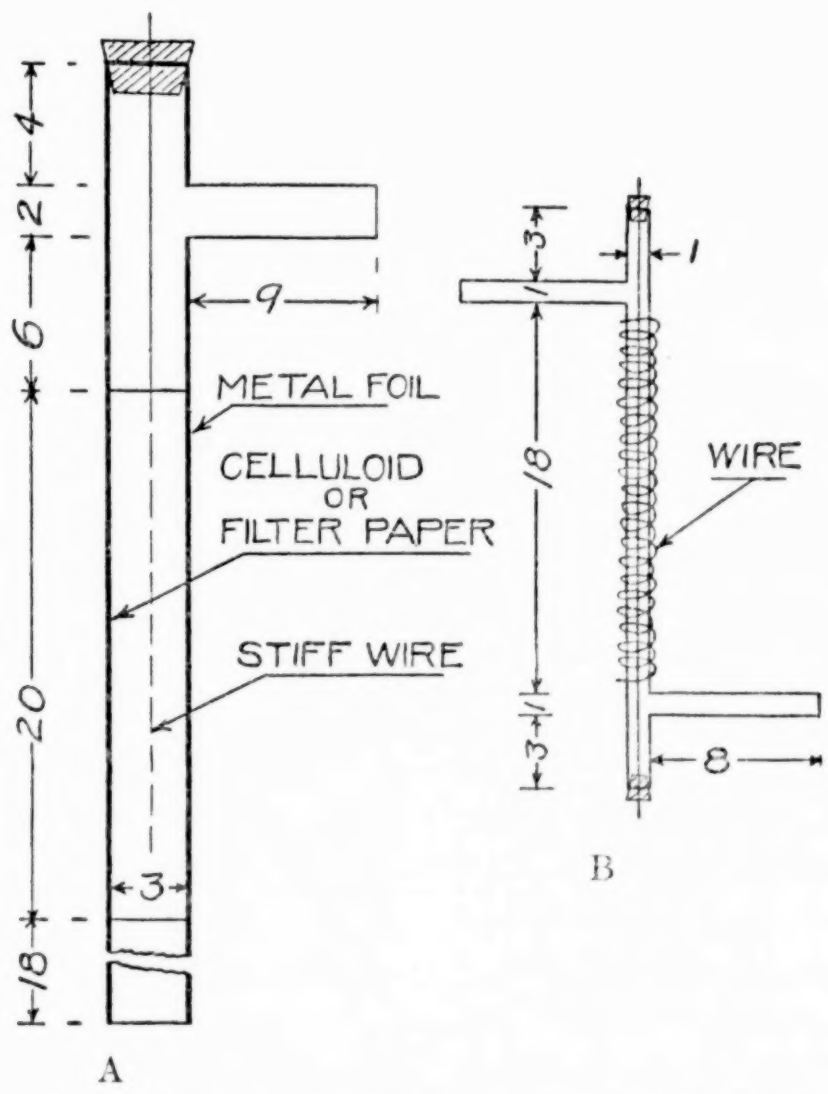

FIG. 2A AND 2B. Dimensions in centimeters of two useful sizes of pyrex precipitator tubes. Celluloid foil or filter paper are not necessary but if used must fit snugly. They can not be used conveniently in small sized tube.

used at lower voltages and low rates of airflow.

Occasionally we puncture a tube as the result of a disruptive discharge but such mishaps are rare and are inexpensive to repair. The fact that we often use either transparent celluloid or filter paper fitting snugly inside the tube is sufficient proof that the fire hazard is slight, but it is none the less sufficient to debar the method in explosive or inflammable atmospheres.

It is advisable to place fuses in both the low tension lines so that these fuses, rather than the main line, blow in the event of a disruptive discharge.

As a source of suction in the laboratory, we use a compressed air ejector with a calibrated glass flowmeter mounted on the wall. In field work we often use a small metal orifice meter with a "hand sized" vacuum cleaner fan as the source of suction. The resistance to airflow of the precipitator tube is negligible so that any source of suction which will draw 50 liters per minute through a resistance of 10 to 15 cm. water gauge, permits the use of the charcoal trap shown in Figure 1.

The practical operating efficiency of this precipitator should be close to perfect. If the efficiency is low, the

TABLE 1.—LIST OF EQUIPMENT FOR COLLECTING DUST SAMPLES BY PRECIPITATION METHOD

1. Luminous-tube transformer, "9TCX20A" (General Electric Company, Schenectady, N. Y.)	$8.00
2. Precipitator Tubes, large size	2.00
Precipitator Tubes, small size	1.00
Flowmeter and manometer (uncalibrated) (Macalaster Bicknell Co., Cambridge, Mass.)	3.00
3. Suction Pump, Hand Cleaner-Motor Fan Wheel (B. F. Sturtevant Co., Hyde Park, Mass.)	9.00
4. Celluloid Foil, "RCS T12," 20″ x 50″ x 3/1000″ (Celluloid Company, Newark, N. J.)	.65
5. Filter paper, 100 sheets, Grade "S," 12 x 24 cms. (Sterling Products Co., Easton, Pa.)	5.00

The gases formed by the high voltage discharge within the tube destroy rubber at an annoying rate but have no effect on glass or metal. These gases are very unpleasant to breathe and are probably toxic. Their destructive action on rubber tubing can be reduced greatly by passing the gases through a 10 to 15 cm. bed of activated charcoal (see Figure 1). Rubber tubing should be inspected frequently, sharp bends should be avoided, and all glass ends on which rubber tubing is fastened should be fire polished.

fault is generally but not invariably corrected either by reducing the airflow, by decreasing the diameter of the tube, or by increasing the voltage. There is no advantage in increasing the length of the tubes shown in Figure 2a. In using celluloid foil or filter paper, low efficiencies may result if the precipitating electrode is not kept well up the tube; otherwise dust is caught on the glass instead of on the foil paper.

It is advisable to use rather fine wire for the precipitating or central electrode and to keep it centrally aligned. A hole pushed through the

Page 366: Table 1 should have been inserted on page 367, immediately preceding the heading "Summary."

center of an ordinary rubber stopper serves satisfactorily for holding either type of electrode shown in Figures 2a and 2b. In the larger open end tube (Figure 2a) we use gold plated drill steel, while fine platinum, gold, or copper wire is used on the small tubes (Figure 2b).

The outer electrode can be made of metal netting, of metal foil, or of copper wire wrapped spirally along the tube. All such wrappings should be pulled tight by hand, and can be held in place conveniently with electrician's or surgeon's tape. Transparent wrappings are convenient as one can see the shape and density of the dust deposit and thus tell how long to sample.

Shocks from the high voltage used may not be a proven danger to human life, but are extremely unpleasant and not lightly forgotten. It is generally the experienced worker and not the novice who needs cautioning.

The following list of equipment may be of help to those desiring to use the precipitation method:

Summary

A description, with illustrations, of laboratory-sized electric precipitators, using inexpensive luminous-tube transformers. Constructional details, costs, and sources of supply are included.

II. Acid Formation in Electric Precipitators

Acids of nitrogen formed by corona discharge may be a source of error when precipitators are used for dust determinations. Precipitated dust can often be quantitated by chemical titration, a method which is applicable to substances titratable by the usual methods of acidimetry and alkalimetry. The dust caught by the precipitator is dissolved in a known solution and titrated with a suitable indicator. If nitrogen is fixed in the form of an acid by the corona discharge, the titration will be in error.

Although the corona discharge has not received the commercial application given the arc method for nitrogen fixation, similar products are formed. The distinctive color of the corona itself is largely due to excited nitrogen molecules (4). An accompanying reaction is the formation of ozone. The production of both nitrogen oxides and ozone in this manner has been studied intensively at Purdue University (4, 5, 6, 7, 8). In part of this work, MacEachron and George used a closed tube similar to our precipitator tubes except in physical dimensions. Two of their findings, with which our rough observations substantially agree, are given below (8):

1. "Increase of current flowing in the discharge increases the yields of both ozone and nitric acid up to a certain maximum, beyond which further increase in current decreases the yields."

2. "The previous electrical history of the gas has a marked effect on the character of the discharge and the products formed."

With reference to the first statement, we found no maximum yield followed by diminishing acid production on further increase of the discharge current. Our current may have been too low to attain the critical point. This possibility however is unimportant, since the purpose of the experiments was not the same nor was the apparatus identical. The second conclusion is of interest in view of the constant

difficulties we had in obtaining check readings.

Considering the fundamental fact that ionized nitrogen and oxygen, and their compounds are the very substance of the visible corona discharge, it is perhaps remarkable that acid formation was never recognized before, so far as the literature reveals, as an invalidating factor in dust sampling by the method described. Drinker, Thomson, and Finn (9), and Brown (10), for example, used this technic in studies on dust retention by man, but experienced no difficulties from acid formation. On the other hand, acid production was clearly evident in Ishikawa's initial experiments (11) on dust retention by cats, even though his apparatus was a replica of Drinker's and Brown's, employing precipitator tubes of the dimensions given in Figure 2a. In all the dust retention experiments cited, the subjects exhaled directly through the precipitator.

Although miniature precipitators have been used in this laboratory for some time, nitrogen fixation had not been recognized as a cause of appreciable error, for the reason that never before had such low air flows been encountered as in Ishikawa's work. The minute volumes of the cats used by Ishikawa were about 5 per cent. those of men. The exhaled air of Ishikawa's animals consequently travelled at a relatively low linear velocity and was exposed to the high-voltage discharge for periods of 0.25 minutes or more. In addition, and of greater importance, during inhalation, the air in the precipitator was motionless. The remedy in Ishikawa's experiments lay in varying three conditions until acid precipitation was negligible: the diameter of the precipitator was decreased, the voltage used was the lowest consistent with total precipitation, and the transformer primary circuit was opened by a relay during the period of inhalation, so that only moving air was subjected to the corona.

In general, the correct choice of air velocity and precipitator voltage will permit the use of the precipitator in any type of experiment. Some of our observations are recorded in the remainder of this paper as a possible aid to others.

The air velocity cannot be increased nor the precipitator voltage decreased beyond the limits which assure complete precipitation. Both the dust velocity and the field intensity depend on the tube diameter. The apparatus consequently requires empirical balancing of the electrostatic field, tube diameter, and air velocity, so as to obtain complete precipitation and yet negligible acid formation.

Precipitation efficiency was measured by directing the air through two precipitators in series; or, for rapid visual tests, by observing the form of the precipitate on celluloid foil (3). Acid formation was measured by titrating with 0.05 N sodium hydroxide, with methyl red as the indicator. A 5 cc. burette was used, readable to 0.01 cc. Alternating current was applied to the precipitator, rectifying devices being unnecessary (3).

Effect of Precipitator Voltage

Tables 2 and 3 show the production of acid for different voltages in closed tubes having inside diameters of 0.92 and 3.10 cms. respectively, and surrounding screen electrodes 16 and 18 cms. long, respectively. The length

of each run was fifteen minutes. These tables represent zero air flow, the condition most favorable to acid production.

TABLE 2.—ACID PRODUCTION AT DIFFERENT VOLTAGES*

Precipitator inside diameter = 0.92 cm. Still air. Tube stoppered. Length of runs = fifteen minutes each.

PRECIPITATOR VOLTAGE	CC. OF .05 N NaOH USED IN TITRATION
5450	0.02
6450	0.03
7260	0.04
8360	0.09
9080	0.13
9630	0.20
9820	0.24
11300	0.30
11800	0.37
13100	0.42
13800	0.45

* Amount of acid produced is expressed in terms of the volume of base required to neutralize it.

TABLE 3.—ACID PRODUCTION AT DIFFERENT VOLTAGES

Precipitator inside diameter = 3.10 cm. Still air. Tube stoppered. Length of runs = fifteen minutes each.

PRECIPITATOR VOLTAGE	CC. OF .05 N NaOH USED IN TITRATION
11400	0.00
12000	0.02
14000	0.03
16400	0.12
18900	0.24
19100	0.93
20400	0.95
21800	2.42

Effect of Air Velocity

Table 4 illustrates the extent of acid formation for varying air flows through a tube whose inside diameter was 0.92 cms. The voltage was constant at 9100. The amount of acid produced, although high at extremely slow air speeds, decreased rapidly until at 1050 cms. per minute it became negligible.

Applying these data to retention experiments with magnesium oxide, for example, if we assume the precipitated magnesium oxide is dissolved in from 1 to 5 cc. of 0.05 N hydrochloric acid,

TABLE 4.—ACID PRODUCTION FOR DIFFERENT AIR FLOWS

Precipitator inside diameter = 0.92 cm. Voltage = 9080. Length of run = fifteen minutes.

AIR VELOCITY	AIR FLOW	CC. OF .05 N NaOH USED IN TITRATION
cm./min.	*L./min.*	
0	0.0	0.16
150	0.10	0.15
301	0.20	0.05
602	0.40	0.03
753	0.50	0.01
903	0.60	0.02
1050	0.70	0.01
1204	0.80	0.01
1500	1.00	0.01
1810	1.20	0.00
1960	1.30	0.00
2250	1.50	0.00

then from the tables it is seen that a 10 per cent. error might easily be incurred.

The above tables give no information on efficiency of precipitation. The tube diameter and voltage should be modified to satisfy the requirements of high efficiency and negligible nitrogen acid fixation, the latter depending on the error permissible in the experiment at hand.

A reconsideration of Brown's data shows that his results were not affected

by acid formation, which, if present, was of no consequence compared to other larger errors fully recognized by him. The weights of dust quantitated were so large (compared to Ishikawa's) by reason of the larger minute volumes of his subjects that any acid generated by the corona probably amounted to 1 per cent., or less, of that used to dissolve the dust sample.

SUMMARY

Acid may be formed in a laboratory electric precipitator to an extent that will invalidate dust measurements, if chemical titration is employed. This error may be eliminated by correct choice of air velocity, tube diameter, and precipitator voltage, and at the same time high precipitation efficiency may be maintained.

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BOOK REVIEWS

THE SPUTUM. ITS EXAMINATION AND CLINICAL SIGNIFICANCE. By *Randall Clifford*, M.D. Pp. 167. New York: The Macmillan Company, 1932.

This book is in no sense another manual for the use of professional laboratory technicians. It has been written for the specific purpose of persuading the practicing physician of the value of his personal inspection of the sputum. It offers evidence of the ease with which valuable information may be obtained from this source and correlated with the other clinical findings in the case. In a small volume the author has collected data which can only be found in widely scattered sources. Emphasis is laid upon the diagnostic significance of various macroscopic and microscopic characteristics of sputum rather than upon complicated methods for their elucidation.

In a systematic manner the collection of sputum and the appearance of its various elements in association with different diseases are discussed and illustrated. The final section summarizes the characteristic features of the sputum in various common pulmonary diseases. Bacteriological examination is confined to its morphological aspects aided by the use of the Ziehl-Neelsen, Smith's Gram-Eosin and Fontana's staining techniques. Sections dealing with the gross characteristics of the sputum and their significance are particularly valuable. Recommendation of the somewhat complicated Smith's Gram-Eosin stain to the exclusion of the simpler forms of gram staining might be criticized but when proficiency with this method has been attained it is undoubtedly most valuable. The section on fungus infections might be profitably expanded but the identification and nomenclature of these organisms is often difficult even for the expert. On the whole the volume is excellent and it is to be hoped that it may fulfill its purpose in persuading more physicians to make at least some portions of the sputum examination in their own offices.—*L. U. Gardner.*

AIR CONDITIONING FOR COMFORT. By *Samuel R. Lewis.* Cloth. Pp. 244 with index and illustrations. Chicago: Engineering Publications, Inc., 1932.

This book is the first one of its kind on a subject which has recently aroused considerable public interest. It deals with the fundamentals and practice of heating and cooling from the standpoint of comfort. Heating systems are "tied up" and discussed along with cooling systems, since much of the equipment used for heating in winter must be adapted and utilized for cooling in the summertime.

The subject matter is divided into twelve chapters, as follows: Explanation of Terminology; Instruments of Service in Air Conditioning; Relation of the Human Body to Air Conditioning; The Influence of the Type of Heating System upon Air Conditioning; Heat Transmission through Building Materials; Calculations for Air

Conditioning Requirements; Sunshine, Evaporation, Air Leakage and Lighting; Air Distribution within the Rooms of Cooling Systems; Controlling the Temperature in Air Conditioning Systems; Water Circulation in Heating and Cooling Systems; Air Ducts in Heating and Cooling Systems; and Computations for an Actual Design.

The last chapter deals with the application of the principles and formulae to two residences and a restaurant.

The author borrowed liberally from the Guide of the American Society of Heating and Ventilating Engineers, and from current research papers on the general subject of air conditioning. The plan and language of the book are simple. All technical terms used are defined plainly in the first chapter. Although not specifically so stated, it would seem that the book was written primarily for the heating contractor who wishes to secure a practical knowledge in the application of air conditioning to homes and public buildings. Anyone who possesses a fair knowledge of simple physics and mathematics should have no difficulty in following the book.

A few exceptions may be taken in the matter of definitions and interpretation of physical laws, but presumably the author preferred to sacrifice technical exactness to clearness.

The printing and illustrations are very good and the book is adequately cross-indexed. On the inside of the back cover is fastened a Bulkeley psychrometric chart which is very useful in solving air conditioning problems.—*C. P. Yaglou.*

INDUSTRIAL MICROSCOPY. By *Walter Garner*, M.Sc., F.R.M.S. Cloth. Pp. 389 with index and illustrations. London: Isaac Pitman & Sons, Ltd., 1932.

The microscope constitutes a valuable tool in the study and control of many industrial processes and special accessory equipment and methods of microscopic technic have been developed to meet the needs of the various problems encountered. Some of these applications of the microscope are discussed in the present volume although its object is not to describe them in detail but more to indicate the equipment and general technic employed, and thus to serve as an aid to the technical chemist in developing methods applicable to his own problems.

The first three chapters are devoted to a description of the microscope, accessory equipment, and general microscopic technic. The optics of the instrument are discussed briefly with only the more important points considered. Accessories of the chemical and metallurgical microscopes are described. A short chapter is devoted to measurement, counting, and drawing, together with descriptions of special devices for these purposes. Apparatus required for photomicrography as well as problems of illumination, contrast, and photographic manipulation, are next considered. In the following three chapters, some of the standard methods employed in chemical microscopy and in inorganic and organic microanalysis are discussed.

The remaining sections of the volume are devoted to special applications of the microscope in botanical and microbiological investigations. A

scheme for the systematic examination of vegetable substances is presented; the microscopic appearance of textile and paper-making fibers is described in some detail. The microscopic examination of insects is considered very briefly and modern classifications of bacteria and fungi are presented together with systematic methods for their microscopic identification. A discussion of the microscopic technic employed in the examination of water and sewage is accompanied by description of typical deposits found in waters from various sources. Methods of sewage treatment are also briefly considered.

In the closing chapter an extensive list of reagents and stains employed in biological and botanical investigation, is presented. Its value is somewhat limited, however, since the uses of these various materials are not indicated.

The author has gathered a large amount of material into one volume which will doubtless prove of value as a general guide in industrial microscopy. Detailed information has been sacrificed to this end, and the volume should not be considered therefore, as a complete reference work. Bibliographies given at the end of each chapter are condensed and are general in nature.—*Theodore Hatch.*

SUBJECT INDEX TO ARTICLES. VOLUME XIV

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ABSTRACT OF THE LITERATURE

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DAVID L. EDSALL, M. D., S. D., United States
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SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

STUDIES ON THE ORIGIN OF CANCER. THE CAPACITY TO CAUSE CANCER. *C. C. Twort and J. M. Twort. Abstr. from Ztschr. f. Krebsforsch., 1930, vol. 32, p. 491, in Am. Jour. Cancer, July, 1931, vol. 15, pp. 1608–1611.*

This is a general survey of the work of the Tworts, and is based on experiments on 45,000 mice, a smaller number of rats, guinea-pigs, and rabbits, and on the use of some hundreds of varieties of tars and oils of various capacities to incite cancer.

A short bibliography is appended. A number of photomicrographs illustrate some of the histologic details of the various types of skin irritation produced.

In the abstract in the *American Journal of Cancer* the authors' summary is quoted in full.

THE MOUSE AS AN INDICATOR OF THE PRESENCE OF CARCINOGENIC NOXAE IN FACTORIES AND DWELLINGS. *O. Teutschlaender. Abstr. as follows from Deutsch. med. Wchnschr., 1930, vol. 56, p. 2166, in Am. Jour. Cancer, July, 1931, vol. 15, p. 1613.*

The discovery in a briquette works of a wild gray mouse with typical tar cancer, evidently produced by pitch dust, suggests that this species could be used to test buildings for dust, gases, or radiant energy that might be carcinogenic in human beings. As

the mouse reacts to such agents within a few months, their presence could be detected before they became operative in man, with his period of from seven to ten years.

If mice had been thus exposed in aniline dye factories, or near the early X-ray machines, a sacrifice of human life would not have been required to demonstrate the danger of these two factors. Even in the case of the so-called "cancer houses" the use of mice might show whether there was some etiologic factor actually inherent in the building.

OCCUPATION AND CANCER. *E. Jakobsen. Abstr. from Ztschr. f. Krebsforsch., 1930, vol. 32, p. 469, in Am. Jour. Cancer, July, 1931, vol. 15, p. 1659.*

This paper contains a general discussion of the influence of occupation on cancer, and must therefore include, of course, the effect of various social practices on the occurrence of the disease.

The paper roams over a rather wide field, includes a large series of industrial cancers, such as tar, oil, and aniline workers' cancer, without adding any specially new facts. It forms, however, a useful summary.

THE EFFECT OF SCHOOL AND INDUSTRY ON YOUNG PEOPLE WITH HEART DISEASE. *Abstr. from Rep. Cardiac Vocational Guidance Service, in Pub. Health Nursing, July, 1931, vol. 23, p. 358.*

This report outlines the history of the work of the association during the past ten years. During the last seven years of the period a special study was made to determine the effect of industry on workers with heart disease, as measured by days absent from work on account of illness. The analysis of the data regarding 395 cases selected for study indicates that cardiac patients can work in a wide variety of occupations; those who worked on jobs classified as "very light" and "light" lost comparatively few days because of illness, the average absence being fourteen days per year.

DAMAGED HEART IN INDUSTRY. *E. M. McIlvain. Michigan State Med. Soc. Jour., Aug., 1931, vol. 30, p. 606.*

ON WRITERS' CRAMP AND OTHER OCCUPATION NEUROSES. *W. Burridge. Jour. Ment. Sc., April, 1931, vol. 77, p. 355.*

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

WOUNDS CAUSED BY ANILINE PENCILS. SEQUELAE. *R. Delgado. Abstr. as follows from Semana méd., 1931, vol. 38, no. 14, pp. 913–918, in Bull. Hyg., July, 1931, vol. 6, p. 541.*

This is a further interesting study of the subject, dealing chiefly with the more remote effects. In some cases the symptoms are almost absent for from six to ten days, after which swelling occurs possibly passing on to suppuration; in others an ulcer arises with blue discharge and increasing in size; in others again, the wound apparently heals and after an interval secondary lesions appear. Clinically,

there are four classes of cases: (1) The fistulous or necrotizing, with a tendency to involve deeper structures, muscle, tendon, and even bone; this is the most common. (2) More localized action, as a necrotic whitlow. (3) Hyperplastic, leading to the formation of a definite tumor with the microscopic characters of a granuloma—fibrous tissue, giant cells, with dark granules and aggregations of small acicular crystals. (4) Occasionally the constitutional signs are marked, headache, debility, perhaps jaundice, but without bile in the urine or clay-colored stools. The only satisfactory treatment is free excision with removal of all stained tissue. If this is neglected the medical man is liable to an action for malpractice, and this condition ought to be added to the list of industrial hazards for compensation purposes.

Animal experiment, as by insertion of a fragment in the muscles of the abdomen of a dog, showed that mere removal of the foreign body is not enough after a brief interval; unless all the stained tissue is excised, the necrotic process will extend. Injection of a 3 per cent. solution of methyl violet beneath the skin causes the same symptoms, and rats injected with particles of methyl violet die in a week or so. The methyl violet has a more intense local action than methyl blue, while the latter becomes more diffuse leading to an almost generalized "vital staining" prior to death.—H. H. S.

PROFESSIONAL DISEASES OF ANILINE INDUSTRIES. *L. S. Latishev. Sovetskaya Klin., 1931, vol. 15, p. 212.*

HYGIENIC CONSIDERATIONS AND INVESTIGATIONS IN INDUSTRY. *Teleky. Abstr. as follows from Deutsch. med. Wchnschr., 1931, vol. 57, pp. 720–723, in Bull. Hyg., July, 1931, vol. 6, p. 540.*

The first of these deals with the author's experience of poisoning by arseniuretted hydrogen gas. An outbreak affecting eleven men (one fatal) occurred in the recovery of cadmium from residues in the manufacture of lithopone (zinc sulphide). The percentage of arsenic in the raw material was 0.073, in the sulphuric acid 0.021, and in the zinc powder 0.0018. Although exhaust ventilation was applied to all vessels it was not efficient. The symptoms were destruction of red blood cells, jaundice, and hematuria. Severity bore definite relation to the time after exposure that symptoms developed: the longer this was, the milder were the symptoms. He has observed the same thing in other cases.

In slight doubtful cases he has been able to find confirmation or otherwise of the diagnosis from analysis of the hair even after three months.

A case is cited where the attack was directly due to the fact that a workman, entering a vessel through a manhole too small to allow of the passage through it of a wooden bucket, borrowed a galvanized iron pail instead, to remove an arsenical residue.—T. M. L.

A CASE OF CHRONIC BENZENE POISONING. *E. R. Hayhurst and B. E. Neiswander. Jour. Am. Med. Assn., Jan. 24, 1931, vol. 96, pp. 269–270.*

A patient with a pronounced case of chronic benzene poisoning was apparently saved by repeated blood transfusions (six in number) in 1926 and

1927. A high iron diet and iron as a medicament was also used, but liver feeding was not given as a therapeutic procedure.

Four years after the first appearance of his symptoms, he is apparently normal except that he shows a moderate leukopenia with relative lymphocytosis.—*Authors' Conclusions.*

SKIN PERMEABILITY WITH RESPECT TO BENZINE AND BENZENE. *N. W. Lazarew, A. J. Brussilowskaja, J. N. Lawrow, and F. B. Lifschitz. Arch. f. Hyg., April-May, 1931, vol. 106, pp. 112–122.*

Benzine and benzene in liquid form can penetrate the skin of rabbits. By determining the time elapsing before the hydrocarbon appeared in the respired air of the animals, it was possible to find the rate of penetration of the skin per square centimeter of surface. The rate of penetration is greater for benzene than for benzine.—L. T. F.

THE BLOOD GAS CONTENT AND ALKALINITY OF THE ARTERIAL BLOOD OF RABBITS DURING CARBON MONOXIDE POISONING. *B. Kamei. Abstr. as follows from Tôhoku Jour. Exper. Med., 1931, vol. 17, pp. 107–126, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4038.*

Following the subcutaneous injection of 400 to 700 c.c. of carbon monoxide gas into rabbits, there are variable changes in the blood hydrogen ion concentration; the arterial carbon dioxide decreases, particularly when acidosis develops. Sodium bicarbonate serves to increase the arterial carbon dioxide and hydrogen ion concentration, and helps counteract the lethal effect of the carbon monoxide.

THE BLOOD GAS CONTENT AND ALKALINITY OF THE ARTERIAL BLOOD OF DOGS DURING CARBON MONOXIDE POISONING. *B. Kamei. Abstr. as follows from Tôhoku Jour. Exper. Med., 1931, vol. 17, pp. 127–146, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4038.*

The subcutaneous injection of 500 to 1,000 c.c. of carbon monoxide into dogs or the inhalation of air containing 0.05 to 0.008 per cent. of carbon monoxide caused no significant change in their respiratory rate or volume. The inhalation of larger concentrations caused a definite increase in pulmonary ventilation, and a decrease in blood hydrogen ion concentration, the blood carbon dioxide content, carbon dioxide capacity, and in the combined dissolved carbon dioxide ratio. Most of the animals died within four days after the injection of the gas, sodium bicarbonate having a definite protective effect. Double vagotomy does not affect the blood changes due to carbon monoxide.

NOTE ON AN APPARATUS FOR DETECTING CARBON MONOXIDE, AND ON AN APPARATUS PERMITTING ONE TO REMAIN IN AN ATMOSPHERE CONTAINING CARBON MONOXIDE. *E. Audibert. Abstr. as follows from Ann. Mines, 1931, vol. 18, pp. 184–201, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 3878.*

The detector described is based on the reduction of iodine pentoxide mixed with fuming sulphuric acid and is analogous to the apparatus used in America except that the mixture is placed on silica gel instead of on

pumice. A mask is described which filters the air through activated carbon impregnated with copper sulphate, ordinary activated carbon, pumice impregnated with soda, calcium chloride, hopcalite, and calcium chloride in the order given.

A Quick Thermal Carbon Monoxide Determination in Place of a Chemical Determination. *A. Karsten. Abstr. as follows from Gsndhts.-Ing., 1931, vol. 54, pp. 70–72, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 3931.*

The carbon monoxide is converted to carbon dioxide by use of a catalyst and the quantity of carbon monoxide determined by noting the temperature change accompanying this reaction.

Experimental Studies on the Action of Copper Dust upon the Animal Organism with Particular Reference to Industrial Hygiene. *E. Remy and E. Zimmermann. Arch. f. Hyg., Jan., 1931, vol. 105, pp. 202–209.*

As a result of dusting rabbits with copper metal, the copper content of the various organs was increased above normal. Muscle was increased 2.7 times, lung 4.4, brain 3.3, spleen 6, and liver 13 times the average normal value. The resorption of copper varies with different animals. No notable pathologic changes were apparent in any of the organs. The fineness of the dust is of great importance to the industrial worker. No toxicity was noted, but the elimination of copper is somewhat different from that of zinc in point of method and rate.—L. T. F.

Professional Fluorism. *A. Feil. Paris méd., Sept. 20, 1930, vol. 2, p. 242.*

Rapid Volumetric Method for the Determination of Lead. *R. C. Wiley. Abstr. as follows from Indust. and Engin. Chem., Analyt. Ed., 1930, vol. 2, pp. 124–126, in Chem. Abstr., 1930, vol. 24, p. 1314.*

A solution of 10 gm. of stannous chloride and 10 gm. of potassium sulphocyanate with 30 c.c. of water gives an indicator which serves as a very sensitive test for molybdenum. In titrating lead solutions with molybdate, therefore, the end point can be determined by a spot test for molybdenum with this indicator.

Early Diagnosis of Lead Poisoning. *I. Fleckel and I. Tschernow. Abstr. as follows from Zentralbl. f. Gewerbehyg., March, 1930, N. S. vol. 7, pp. 65–72, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4059.*

The authors have studied a large number of persons, some healthy and others showing symptoms of lead poisoning. They developed a method of classification based on the ratio of reticulocytes to normal erythrocytes. The relation of hemoglobin content to reticulocytes in persons working with lead and others outside of the industry is shown.

Differential Diagnosis of Lead Poisoning. *J. S. Mark. New Jersey Med. Soc. Jour., April, 1931, vol. 28, p. 334.*

Plumbism. *R. L. Willcox. Correspondence, Brit. Med. Jour., Aug. 1, 1931, vol. 2, p. 222.*

Attention is directed to the danger which in time past arose from home-made wines fermented in utensils glazed with a lead compound. Ginger

beer similarly made may also take up lead from the glaze. In one instance a cider press with a lead tray to catch the expressed apple juice went round many farms and left in its trail blue lines, yellow eyes, and stomach ache.—E. L. C.

PLUMBISM. *E. Milligan. Correspondence, Brit. Med. Jour., Aug. 1, 1931, vol. 2, pp. 222–223.*

The existence is stressed of a mild and insidious form of lead poisoning due particularly to lead soluble water. An area is quoted with an infantile mortality of 134, which fell to fifty-six when the water was treated to prevent lead solubility. The water had been found to contain, wherever there was a lead pipe, from $\frac{1}{10}$ grain to $\frac{3}{4}$ grain per gallon. The relation between high maternal mortality and lead soluble water is noted.—E. L. C.

CUMULATIVE EFFECTS OF INFINITESIMAL DOSES OF LEAD. *N. Porritt. Brit. Med. Jour., July 18, 1931, vol. 2, pp. 92–94.*

The claim is made that far more often than is generally appreciated, lead absorption arises from plumbisolvent water in areas with a soft moorland water supply. A description is given of the curious lethargy which arises insidiously from consumption of such water over long periods, with lead varying from $\frac{1}{125}$ to $\frac{1}{5}$ grain per gallon. In such cases lead may be detected in the urine; instances are given of $\frac{4}{7}$ grain, $\frac{4}{25}$ grain, and $\frac{8}{9}$ grain of lead per gallon being present. As lead is selective in its attack, only one person out of a household drinking the same water may be affected. The question is also raised as to whether maternal mortality due to eclampsia and nephritis may not be increased by plumbisolvent water; such mortality is higher where such waters are used than elsewhere. Cases of the type described are to be suspected when absence from home is accompanied by improvement in health which is soon lost on return.—E. L. C.

CHRONIC LEAD POISONING. *E. Zadek. Ztschr. f. klin. Med., March 31, 1931, vol. 116, p. 241.*

LEAD COLIC WITH DOUBLE PAROTITIS AND WITHOUT PERIPHERAL ARTERIAL HYPERTENSION: RÔLE OF LOCALIZED VASCULAR SPASM. *M. Villaret and R. Wallich. Paris méd., June 13, 1931, vol. 21, p. 549.*

ON THE QUESTION OF THE MORPHOLOGIC CHANGES IN THE SYMPATHETIC NERVOUS SYSTEM IN EXPERIMENTAL LEAD POISONING. *F. F. Grünberg. Abstr. as follows from Virchows Arch. f. path. Anat., 1930, vol. 278, pp. 372–382, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., March 11, 1931, vol. 58, p. 608.*

Observations were made on the histologic changes in the cervical ganglion, the ganglia of the vertebra column and of the plexus, and the ganglion nodosum in eighteen cats poisoned with lead carbonate (25 mg. of lead carbonate in 1 c.c. of distilled water with a slight quantity of gum arabic added; 20 to 50 mg. per kilogram of body weight; length of experiment from three weeks to four months, one to two injections a week). Two animals gave scarcely any reaction. Six showed considerable evidence of poisoning, consisting in diffuse de-

generation of the ganglion cells in the form of the disappearance of the tigroid substance, shrinking of the nucleus, and pyknosis, particularly in the superior cervical ganglion and the celiac plexus. The same changes occurred in the inferior cervical ganglion, even more marked but circumscribed. Seven animals of the group showed very severe symptoms of poisoning which led to death with clonic and tonic convulsions. The changes in the ganglion cells were correspondingly more extensive and there was a displacement of the chromatin toward the periphery of the cell, as well as hyperplasia of the neuroglia. These changes were most sharply defined in the inferior cervical ganglion. The changes observed are, however, unspecific, as they are frequently met in infectious diseases. Nevertheless, they serve to show that the severe nervous symptoms in lead poisoning are due not only to functional but to organic disturbances.

REMARKS ON SOME CLINICAL PICTURES ATTRIBUTABLE TO LEAD POISONING WITH SPECIAL REFERENCE TO THE NEUROLOGICAL MANIFESTATIONS OF PLUMBISM. *E. Bramwell. Brit. Med. Jour., July 18, 1931, vol. 2, pp. 87–92.*

Several unusual cases with anomalous nervous symptoms are recorded in which investigation disclosed exposure to lead. One case of right-sided radial paralysis in a lead smelter of ten years' exposure is fairly obvious; but a business man, who had lost 3 stone in weight and suffered from obscure pains and muscular weakness of the arms, was a puzzle, until 0.12 grain of lead per gallon was found in his house tap water. The wife of a gamekeeper with progressive muscular atrophy and symptoms attributed to gastric ulcer was another difficult case, until a new water supply from a peaty well was examined and found to contain 0.4 grain of lead to the gallon. Another case presented encephalopathic symptoms with intense headache, vomiting, and double vision; it was due to diachylon pills taken to terminate a pregnancy. The last case was one of spastic paraplegia which recovered when the water supply containing 0.15 grain of lead per gallon was altered for a supply free from lead contamination. The author points out that the possibility of lead poisoning calls for consideration in all cases with anomalous nervous symptoms.—E. L. C.

MODERN THERAPY OF LEAD POISONING. *Teleky. München. med. Wchnschr., Feb. 27, 1931, vol. 78, p. 354.*

The author reviews the modern theories of lead absorption, circulation, and deposition, and discusses calcium therapy with respect to lead poisoning as well as other therapeutic means of de-leading chronic sufferers. —L. T. F.

THE PERMEABILITY OF SEMIPERMEABLE MEMBRANES, PARTICULARLY THAT OF THE SKIN, FOR LEAD UNDER THE ACTION OF ELECTRIC CURRENT. *A. Seitz. Arch. f. Hyg., June, 1931, vol. 106, pp. 160–167.*

Animal experiments showed that the animal cannot be de-leaded by the action of the electric current. In only one case was any lead trans-

ferred by this means and in that one the amount of lead was but a trace. The author concludes that the therapeutic use of the electric current for de-leading lead poisoned industrial workers is of no value.—L. T. F.

ACUTE MERCURY POISONING, ITS TREATMENT, AND CHANGES IN THE CHLORINE, WATER, NITROGEN, AND ACID-BASE EQUILIBRIUM DURING ITS COURSE. *A. Landau, J. Glass, and I. Beiles. Abstr. as follows from Wien. Arch. inn. Med., 1930, vol. 20, pp. 319–342, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., March 11, 1931, vol. 58, p. 609.*

In this paper a case of acute poisoning with mercury oxycyanate is examined in minute detail. The history of the patient is given and the course of the illness is divided into five periods: *Stage 1*—lasting until the appearance of anuresis: local disturbances in the oral cavity, vomiting, and diarrhea; *Stage 2:* anuresis, azotemia, diminution in the alkali reserve of the plasma as well as in the chlorine content of the blood; severe necrotic changes in the oral cavity, edema of the tongue, necrosis of the epithelium, and mercury line on the gums; *Stage 3:* relative improvement; *Stage 4:* so-called period of late azotemia or toxic protein change, sudden rise in temperature, maculopapular exanthema, fresh necroses in the oral cavity, hemorrhagic diathesis (nosebleed, bleeding from the right tonsil), increase in azotemia; *Stage 5:* definite improvement. The chemical analytic data (residual nitrogen content, chlorine content of the blood, and so on) are also given individually, and an attempt is made to bring the individual symptoms into causal relation. For therapy the administration of bismuth is recommended, and also in cases such as that described, where the chlorine in the blood is low, the addition of sodium chloride to the food.

CHANGE IN LYMPHATIC STRUCTURES OF THE SPLEEN IN RABBITS WITH TAR CANCER. *A. Babes. Abstr. from Bull. Assn. franç. pour l'étude du cancer, 1930, vol. 19, p. 765, in Am. Jour. Cancer, July, 1931, vol. 15, p. 1615.*

Babes found, in rabbits succumbing to the toxic effect of tar painting, an atrophy of the splenic pulp amounting almost to disappearance. This atrophy was brought about by the disappearance, by pyknosis, of lymphocytes, as well as the elements of the germinative centers of the malpighian bodies.

In those rabbits which survived the toxic effect and developed tar cancer, there was found, at the onset of cancer, a beginning overactivity of the germinative centers of the malpighian corpuscles, characterized by multiplication of active centers and increase in number of karyokinetic figures. When the cancer was fully developed and growing, the number of centers in full activity increased noticeably, as did the number of karyokinetic figures. These features decreased in proportion to the degree of regression of the cancer.

DUST HAZARDS AND THEIR EFFECTS

DUST IN ULTRAVIOLET LIGHT. *Pfaff. Schweiz. med. Wchnschr., Dec. 13, 1930, p. 1174.*

The author made dust counts on air samples (300 c.c.) collected under a quartz lamp before it was lighted and on samples collected three or four minutes after the lamp had been lighted, at a distance of 50 cm. from it. Counts are given from two experiments, both of which showed a 59 per cent. increase in flocculation of dust particles after the lighting of the lamp. The author gives as explanation of this that the air becomes ionized in the vicinity of the ultraviolet light and removes the electric charge from the dust particles, thus allowing them to settle in greater numbers.—M. C. S.

THE NATURE OF THE DUST IN THE AIR OF COTTON-CARD ROOMS. *R. H. Pickard. Abstr. as follows from Jour. Textile Indust., 1930, vol. 21, pp. 595–604T, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4132.*

This is a report of an investigation of the dust produced during carding in seventeen card rooms covering the widest possible range of conditions in regard to the type of cotton, the dimensions and layout of the room, the efficiency of the ventilation, and the method of stripping. The dust is shown to consist mainly of minute almost invisible particles, less than 0.01 mm., and of a few large particles, chiefly fragments of fiber, which are, in general, numerically unimportant. The sampling of the air by Owens' jet extension apparatus, the computation of the minute particles, and the expression of the results are described. The composition of the dust from a chemical and biologic standpoint is discussed. The ratio of the number of organisms of all kinds to the total number of dust particles in the atmosphere did not vary greatly in the tests. The mildew organisms belonging to the Aspergillus niger group were invariably strongly represented. Of the total number of fungus spores present, they rarely formed less than 50 per cent., and at times exceeded 90 per cent. Chemical analysis of the dust (ten samples) indicated that it was composed of about 90 per cent. organic matter, and about 10 per cent. inorganic matter. The organic matter consisted of cotton hair fragments, seed coat particles, and fungus spores. Approximately 60 per cent. of the inorganic matter was silica, and the remainder was chiefly iron.

A COMPARATIVE STUDY OF DUST FILTERS. *T. M. Kozlyaev. Arb. wiss. Forsch.-Sekt. Leningrad., Abt. Arbeitsschutzes, 1927, vol. 1, part 2, pp. 263–277.*

TUBERCULOSIS AND PULMONARY ANTHRACOSIS. *M. Stassen. Abstr. from Rev. belge de la tuberc., July–Aug., 1929, vol. 20, p. 147, in Am. Rev. Tuberc., May, 1931, vol. 23, pp. 103–104.*

This is a review and discussion of tuberculosis and anthracosis in coal miners, presented under the following headings: (1) route of passage of dust; (2) nature and properties of coal dust; (3) physiologic factors affecting health of coal miners; (4) action of coal dust

on sensitized human respiratory mechanism; and (5) search for tubercle bacilli in sputum. Interested readers are referred to the abstract in the *American Review of Tuberculosis.*—E. O.

METHODS FOR SUPPRESSING DUST IN ASBESTOS TEXTILE FACTORIES. HOME OFFICE REPORT. *H. M. Stationery Office, 1931.*

Embodied in this report are a series of agreements between employers and inspectors as to danger points and methods of dust suppression in textile asbestos factories. The report is well illustrated throughout by diagrams and also by photographs of actual plants. The danger from asbestos dust has raised new and difficult problems in ventilation for dust suppression. These problems can, however, be surmounted by the use of modern appliances; but time must elapse before the dust danger in this industry can be brought under control. The interest in this report is the demonstration it gives of the advances which have taken place in recent years in the technic of locally applied exhaust ventilation for suppressing any dust hazard. —E. L. C.

SILICOSIS IN SOUTH AFRICA. A SYMPOSIUM ON THE HISTO-PATHOLOGY, PATHOLOGICAL ANATOMY AND RADIOLOGY OF THE DISEASE. *F. W. Simson, A. S. Strachan, and L. G. Irvine. Proc. Transvaal Mine Medical Officers' Assn., Special Supplement, 1931, vol. 10, no. 118, pp. 44.*

Three papers are presented here in order to set out plainly the conclusions arrived at by South African experts relative to the pathologic types which are associated with different combinations of silicosis and tuberculosis. Simple silicosis starts in lymphoid tissue, which occurs anatomically along the air passages rather than the blood vessels; it is instigated by the arrival in this tissue of phagocytes carrying silica particles. A silicotic islet forms enlarging into a nodule on a whorled plan. Such nodules may coalesce with neighboring ones, and form a fibroid mass; they are generally distributed fairly evenly throughout both lungs.

Should tuberculous infection occur simultaneously with the dust inhalation, the fibrous formation is usually more rapid and more massive; further, it shows a tendency for the center of the nodule to become necrotic. This pathologic condition is called infective silicosis; but it may progress slowly over years, during which the patient appears in fair health and experiences no toxic symptoms. Finally such a case becomes one of overt tuberculosis. Should the tuberculous infection be present before the dust is inhaled, the tendency is for similar infective nodules to occur; but their distribution is isolated and not symmetrical, depending upon the sites of original infection. When, however, the tuberculous infection is superimposed upon simple silicosis, caseous tuberculosis may be found surrounding the fibrous nodules, which in themselves show little sign of necrosis; this condition is usually one of overt tuberculosis from the commencement of infection.

An opportunity arose for correlating pathologic findings with clinical symptoms and X-ray shadows from 400 cases in which a clinical examination and radiograph had been taken within six

months of death. An explanation is given of the classification used in judging radiographs. First comes general arborization, then slight mottling which gradually becomes coarse; all these are shown by simple silicosis. The presence of active tuberculous infection is indicated by cloudy shadows, usually localized.—E. L. C.

SILICOSIS. *E. L. Collis. Bull. Hyg., April, 1931, vol. 6, pp. 305–312.*

This is a good general review of the subject, short and to the point. There are no references in the text, but an excellent bibliography is appended.—P. D.

FIBROSIS OF THE LUNGS IN SOUTH COAST COAL MINERS, NEW SOUTH WALES. *K. R. Moore and C. Badham. Health, Commonwealth of Australia, 1931, vol. 9, pp. 33–40.*

The results are reported of examining 471 coal miners with not less than ten years' experience below ground. The inquiry was made to ascertain the influence on the lungs of mine dust before stone dusting was put into practice. Fibrosis was found in 25.9 per cent.; it increased with length of exposure, attaining 40.8 per cent. for men with over thirty years' industrial history. The fibrosis among these South Coast coal miners in radiographs shows as a fine-grained type diffused generally over the lungs; occasionally it is coarser where an infective element is present. It resembles the findings of asbestosis rather than silicosis; and is in accord with other findings among coal miners (see THIS JOUR., 1931, vol. 13, p. 19). Estimations of disability among such miners with fibrosis must depend more upon clinical examinations than upon radiographic findings. The onset of the condition is slower and any disability caused is less definite than fibrosis among the metalliferous miners; no tendency to succumb to tuberculosis was apparent. More knowledge as to pathology and histology is desired.—E. L. C.

PNEUMONOKONIOSIS, TUBERCULOSIS, AND SOCIAL CONDITIONS IN IRON FOUNDRY WORKERS IN VIENNA. *B. Komissarnk. Arch. f. Gewerbepath. u Gewerbehyg., 1931, vol. 2, no. 1.*

This is a report on the results of examining a group of forty workers in an iron foundry clinically and by X-rays, and also of questioning them as to their family history and conditions of living. There were altogether 153 persons employed at the foundry. None who had less than ten years' work at the foundry were examined. A description is given of the process of casting and the cleaning of castings, and the various materials used are enumerated. The most important injurious factor is sand dust, and according to Collis the sand used in molding contains almost 79 per cent. of silica (SiO_2).

The men worked for nine and three-fourths hours on five days a week and did no work on Saturdays. Of the forty examined half were from 51 to over 60 years of age; thirteen had worked from thirty-one to forty years, five from forty-one to fifty years, and two over fifty years. About 95 per cent. had been employed continuously on dusty work. In twelve cases the fathers of the men examined had also worked at the foundry and had lived from 75 to 84 years; none had died of tuberculosis. According to the statements of the workers there were only

nine cases in which a member of the family had died of tuberculosis.

Of the forty examined, four were definite cases of pneumonokoniosis, five were suspected cases, and three were borderland cases.

By X-ray examination twenty-three were found to have signs of old inactive pulmonary tuberculosis but no tubercle bacilli were found in the sputa.

The investigations show the necessity of improving the hygienic conditions of work by dust estimation and air analyses in the places of work, and by careful attention to the ventilation system and the working of the exhausts. —A. J. C.

EXPERIMENTS TO DETERMINE THE MINIMUM AMOUNT OF COAL-DUST REQUIRED FOR PROPAGATION OF A MINE EXPLOSION. *G. S. Rice and H. P. Greenwald. U. S. Bur. Mines, Rep. Investigations, Serial No. 3132, Aug., 1931, pp. 3 (multigraphed).*

Tests in the Experimental Mine have shown that the lower limit of inflammability of through 200-mesh Pittsburgh coal dust lies between 0.032 and 0.08 ounce per cubic foot under the conditions there obtaining. It appears that the limit will be not far from 0.05 ounce per cubic foot. This is a very small amount and is equivalent to 3 ounces per linear foot in an entry of 60 square feet in cross section. Such an amount distributed over all the surfaces could be detected only by careful examination. It is evident that no coal mine can be so clean that propagation of coal dust explosion is impossible, a conclusion voiced by the Bureau's engineers many years ago, and one which points to the need of efficient rock dusting to prevent coal dust explosions.—*Authors' Conclusions.*

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

INFECTIOUS AGENTS IN INDUSTRY. *F. Schoofs. Rev. d'hyg., Jan., 1931, vol. 53, pp. 32–37.*

The author discusses the occurrence in Belgium of ankylostomiasis, anthrax, syphilis, and smallpox, and refers to the legislative measures which have been adopted for their control.

ORGANIZATION OF A CAMPAIGN AGAINST ANKYLOSTOMIASIS IN A MINING CAMP. *C. Garin, J. Rousset, and B. Gonthier. Abstr. as follows from Méd. du travail, March, 1931, vol. 3, pp. 37–48, in Bull. Hyg., July, 1931, vol. 6, p. 539.*

The first need is a complete examination of the stools of everyone working below ground. An accurate list must be obtained and the co-operation of the workers insured. Special sanitary conveniences must be erected, where a bucket is used for defecation and then passed to an attendant who takes a sample for transmission to the laboratory. Telemann's method for the microscopic counting of the eggs present is employed, wherein an aqueous emulsion, after being shaken up with hydrochloric acid and ether, is centrifuged; a drop of the deposit is then placed under a cover slip and examined. Particular attention is directed to the organization of the work so that from 150 to 200 samples can be dealt with daily, and to strict cleanli-

ness in technic throughout. Every new applicant for work should be examined, and those in service should be reexamined periodically. Each case should be classified according to the number of eggs found and the place of employment. Samples are given of the forms filled in at the laboratory for this purpose.—E. L. C.

TREATMENT OF ANTHRAX WITH LARGE DOSES OF SPECIFIC SERUM. *L. Cheremushkina. Abstr. as follows from Odessk. med. jur., 1930, vol. 5, p. 295, in Arch. Dermat. and Syph., July, 1931, vol. 24, p. 136.*

Cheremushkina's experience includes 115 patients with anthrax. A dose of 150 c.c. of antianthrax serum was injected intravenously, on three successive mornings. On exception, the serum was injected also in the evening. It was warmed and injection was made slowly. In some cases, phenomena of serum sickness occurred, which lasted only a few hours. The local treatment consisted first in the application of dressings moistened with a 1:3,000 solution of corrosive mercuric chloride or with a 1:1,000 solution of potassium permanganate: later in the application of an ointment. The author stresses that antianthrax serum prevented the local infection from becoming general and it was frequently possible to cure an anthrax septicemia. The amount of the serum given may total up to a liter. In cases of medium intensity the serum is administered intramuscularly in a dose of from 80 to 200 c.c.; the dose can be repeated. In severe cases the serum ought to be administered intravenously and intramuscularly (from 80 to 120 c.c. at once). The action of the serum is probably antitoxic and bactericidal.

PNEUMONIA IN THE NATIVE MINE WORKERS OF THE WITWATERSRAND GOLDFIELDS. A BACTERIOLOGICAL AND EPIDEMIOLOGICAL STUDY. *D. Ordman. Abstr. as follows from Jour. Med. Assn. So. Africa, 1931, vol. 5, pp. 108–116, in Bull. Hyg., July, 1931, vol. 6, p. 552.*

The history of lobar pneumonia among the native mine workers of the Witwatersrand gold mines is studied from 1907 to 1929. A chart is shown illustrating the fall in the mortality rates between 1907 and 1927, and the slight rise since 1927. The seasonal incidence is discussed. In the earlier part of the period a frank lobar pneumonia with the classical crisis was commonly seen. A pure culture of the pneumococcus was almost invariably isolated from the lungs. Later, following the prophylactic inoculation of the native mining population with a vaccine made up with strains of the pneumococcus, the incidence and mortality rates of lobar pneumonia showed a striking decrease. From 1927 onward a change has occurred in the bacterial flora, and the efficiency of the prophylactic vaccine designed to protect against a pure pneumococcal infection has diminished. The active co-operation of the clinician dealing with cases of lobar pneumonia and the laboratory is considered of great importance.—H. M. W.

PULMONARY TUBERCULOSIS FROM INDUSTRIAL STANDPOINT IN A LANCASHIRE COUNTY AREA. *G. Jessel. Tubercle, Aug., 1931, vol. 12, p. 481.*

UNDULANT FEVER—AN OCCUPATIONAL DISEASE. SOME REFLECTIONS ON THE SUBJECT OF ITS ETIOLOGY AND PROPHYLAXIS. *P.-L. Julien. Rev. d'hyg., March, 1930, vol. 52, pp. 195–200.*

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

AMMONIUM PERSULPHATE IN "YEAST FOODS" AS A CAUSE OF ALLERGIC DERMATITIS IN BAKERS. *F. S. Hansman. Med. Jour. Australia, July 25, 1931, vol. 2, pp. 94–98.*

The occurrence of thirty cases of dermatitis among dough mixers led to the research reported, in which the various components of dough were applied to the skin by both the scratch and the contact method. No reactions followed with normal persons; but when ammonium persulphate was used on previous patients, reactions occurred at the sites of application and at sites previously affected with dermatitis. It was, however, found possible to sensitize a normal person by successive applications, provided fresh solutions were used each time. As reactions were also obtained with potassium persulphate, the intact radical S_2O_8 was held to blame. The experiments pointed to an allergic condition's being established by manual labor with dough in which ammonium persulphate is used as a yeast food. If dough is mixed by machinery, so that it is not handled until after quickening, there is no danger in using this yeast food.—E. L. C.

CONTRIBUTION TO THE KNOWLEDGE OF BAKERS' ECZEMA (BAKERS' ITCH). *N. C. van Vonno. Abstr. as follows from Acta derm.-venereol., April, 1931, vol. 12, p. 1, in Jour. Am. Med. Assn., Aug. 22, 1931, vol. 97, p. 586.*

In his discussion of bakers' eczema, van Vonno stresses his studies on the etiology of this complaint, especially his investigations on its allergic nature. He investigated whether sufferers from bakers' eczema are also subject to asthma. The results were negative, for not one of the patients with bakers' eczema had asthma. Further, the author describes the symptomatology and then reports tests on himself and on persons who volunteered for cutaneous tests. He was not able to produce the eczema either on himself or on the other persons, by means of the fluid taken from the vesicles of the eruption in a patient with bakers' eczema, nor could he transmit the eruption to other parts of the patient's own body. Repeated investigations on persons with bakers' eczema never revealed a fungus that could be considered the cause of the disease, and therefore a parasitic cause of the disease can be excluded. The author further reviews the literature on the etiology of bakers' eczema. He tested the sensitivity of bakers with and without the eczema and of other persons to extracts of various kinds of flour. These tests revealed that the handling of flour intensifies the sensitiveness of the organism to flour extracts. To verify an opinion expressed by some that a function of allergy is attributable to a substance from the suprarenals, to epinephrine, the author tested the susceptibility of persons with bakers' eczema to injected and to

orally administered epinephrine preparations, but a diminished reaction was never observed. His own investigations as well as those of others convince him that some people have an idiosyncrasy to flour. He also thinks that in the bakers' trade one can acquire an allergy through a prolonged contact. Bakers' eczema is therefore an allergic dermatosis and an occupational disease, but the author thinks that cleanliness can prevent the complaint.—C. K. D.

ECZEMA DUE TO LEMON PEEL. *S. J. Fanburg and J. G. Kaufman. Jour. Am. Med. Assn., Aug. 8, 1931, vol. 97, p. 390.*

J. H., a white man, aged 23, was employed by a beverage manufacturing company for four weeks. A week after he began work he was assigned the task of peeling lemons by hand. Itching sensations, followed by an eruption on the hands and forearms, began soon thereafter. In the midst of the peeling operation he would rub both hands and arms to get relief. When first seen, May 2, 1931, he presented an erythematous, vesicular eruption on the dorsum of each hand and on the anterior and posterior aspects of the forearms. A few scattered minute pustules were on the back of the hands. An erythematous vesicular eruption was found on his chin and neck.

Contact tests were carried out with fresh lemon peel and lemon juice. These were negative for the lemon juice, but after twenty-four hours the area tested with the peel presented an erythematous, vesicular eruption similar in type to that on the hands and arms. Control tests carried out on other patients gave negative results.

Under soothing applications, the eruption gradually disappeared.

DIFFERENTIAL DIAGNOSIS OF OCCUPATIONAL ECZEMAS. *M. Michael and C. Radeff. Deutsch. med. Wchnschr., Feb. 27, 1931, vol. 57, p. 353.*

EAR PHONE DERMATITIS: CASE. *J. J. Eller. Arch. Dermat. and Syph., Aug., 1930, vol. 22, p. 268.*

A NEW METHOD OF LOCALIZING FOREIGN BODIES IN THE EYE. TELERADIOGRAPHY WITH VISUALIZATION OF THE CORNEA. *H. Ahlbom. Acta radiol., July 15, 1931, vol. 12, pp. 212–235.*

The author presents a brief summary of the more important methods, described in the literature, for radiographic localization of foreign bodies in the eye. He then gives an account of a new method, which is based upon the taking of two images in two planes at right angles to each other, one of them being a profile picture with the cornea visible. Both the pictures are taken with a focus-plate distance of 2.75 m. The cornea is rendered visible in the lateral view through an aluminium wedge being placed between the patient's eye and the cassette. The patient is seated during examination and special measures are adopted to enable the investigator to control the direction of the line of vision during exposure. As an extra safety measure the principle of the so-called physiologic method, *i. e.*, change of the direction of vision, is applied. The localization is carried out directly on wet films with the aid of patterns, which are drawn on transparent film, employing direct measurement with a

pair of compasses. No so-called contact markers need to be attached to the eyeball.—*Author's Summary.*

DOES ULTRAVIOLET PARTICIPATE IN THE ETIOLOGY OF GLASSWORKER'S CATARACT? *A. Vogt. Abstr. as follows from Klin. Monatsbl. f. Augenh., March, 1931, vol. 86, p. 295, in Am. Jour. Ophth., Aug., 1931, vol. 14, p. 861.*

In Vogt's experiments with penetrating infra-red, ultraviolet does not participate in the formation of cataract because it is completely eliminated by the iodine-potassium-iodide solution. Nor does ultraviolet participate in the development of glassworkers' cataract. Vogt proved this by exposing photographic copying paper, which is chiefly sensitive to ultraviolet, to daylight at noon, and from a distance to the glow of the glass furnace at which the glassworker operates. The first was completely blackened after a few minutes, while the latter was still unaltered after three and more hours. Hence, the ultraviolet of daylight even under an overcast winter sky by far predominates over that of the glowing glass mass. Vogt expresses the hope that the myth of ultraviolet damaging the lens will disappear from ophthalmologic literature.

MINERS' NYSTAGMUS. *W. J. Roche. Brit. Med. Jour., July 11, 1931, vol. 2, pp. 55–57.*

An investigation is described which was made at two adjoining pits where the only important variant was a greater reflecting power from the coal in pit A than in pit B; the same seam of steam coal was worked. In pit A, 26.25 per cent. of the miners had involuntary eye oscillations, and 0.3 per cent. were on compensation for nystagmus; in pit B, 41.42 per cent. had oscillations, with 1.3 per cent. on compensation. The higher incidence in B is ascribed to the poorer reflection of light, since the illumination from the lamps in the two pits was similar. The introduction of electric lamps increased nystagmus, because the illumination was not thereby increased sufficiently, while glare from the lamps was greater. Lamps giving not less than 4 candle power are needed to insure the employment of central vision; cap-lamps give ideal illumination. The glass should be frosted to avoid glare and pillar shadows. Flood illumination at coal faces would be better than individual lamps.—E. L. C.

TRANSITORY MYOPIA AFTER INJURY BY STEEL FOUNDRY ASHES. *Roggenkämper. Abstr. as follows from Klin. Monatsbl. f. Augenh., Feb., 1931, vol. 86, p. 239, in Am. Jour. Ophth., July, 1931, vol. 14, p. 713.*

Ashes from a steel foundry furnace flew into the eyes of a laborer aged 27 years. The corneas showed erosions and the whole uvea and optic nerve showed inflammatory changes. Vision was reduced to 5/50, with −5.00 sph. −0.75 cyl. ax. 180° = 5/5, under atropine cycloplegia. The myopia subsided entirely within seven weeks. The ashes of steel furnaces contain arsenic and in analogy to the transitory myopia observed after injections of salvarsan and attributed to irritation of the ciliary muscle, the author assumed local poisoning by arsenic, favored by a local hypersensitiveness to this metal.

INDUSTRIAL SURGERY

PHYSICAL THERAPY FOR INDUSTRIAL INJURIES. IS IT OF ECONOMIC VALUE? *J. E. M. Thomson. Arch. Physical Therapy, X-Ray, Radium, July, 1930, vol. 11, pp. 327–329.*

This paper discusses the respective parts played by the patient, by the employer or his insurance company, and by the physician or physiotherapist in determining the economic value of physical therapy in rehabilitating the industrially injured. According to this writer, worth while economic results depend upon having the patient's mental attitude properly directed; upon the employer's appreciation that carefully administered physical therapy truly shortens the period of disability and decreases the amount of permanent disability; and upon tact, determination, and even temerity on the part of the physiotherapist in dealing with the patient's physical handicaps and molding his attitude.—H. W. S.

APPLICATION OF PHYSICAL THERAPY MEASURES IN THE TREATMENT OF BURNS. *W. S. Peck. Arch. Physical Therapy, X-Ray, Radium, June, 1931, vol. 12, pp. 327–330.*

This paper contains an outline of physical therapeutic measures which may be used in conjunction with the surgical treatment of extensive burns requiring skin grafting.

The preparation of the wound for skin grafting is described as well as the technic of applying ultraviolet radiation.

The early use of active motion, massage, and therapeutic exercise is considered.—*Author's Summary.*

CHANGES IN SUGAR AND LACTIC ACID CONTENT OF BLOOD CAUSED BY BURNS. *M. A. Slocum and H. D. Lightbody. Abstr. as follows from Am. Jour. Physiol., 1931, vol. 96, p. 35, in Arch. Dermat. and Syph., Sept., 1931, vol. 24, p. 453.*

The concentration of sugar and lactic acid in the blood of rabbits after superficial burns was studied both in otherwise intact animals and in animals that had been adrenalectomized. In both there was an increase in blood sugar and in lactic acid, but the increase in the latter was small and insufficient to account for the high value of the sugar. In the animals with intact adrenal glands, the heightened level of the sugar was maintained after twenty-four hours, but lactic acid was reduced below its initial value. Apparently the increased activity of the adrenal glands does not account for the increase in blood sugar through the intermediary of lactic acid, nor for that by decrease in the oxidation rate.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

CONTRIBUTIONS TO THE PHYSIOLOGY OF DIFFICULT PHYSICAL ACTIVITY. I. THE BLOOD SUGAR DURING AND AFTER WORK. *E. H. Christensen. Arbeitsphysiol., March, 1931, vol. 4, pp. 128–153.* (*Translation of Author's Summary.*)

Blood sugar determinations were made on one female and two male subjects during and after work. A thorough review of preceding literature indicates that, in general, up to the present time no satisfactory blood sugar determinations during physical exertion have been made. It is evident on the basis of the author's research that only the values which are obtained during unaltered activity may be termed work values; if activity is interrupted even for less than a minute the values obtained are not work values, but recovery values. The figures obtained show great individual variations from experiment to experiment; however, all curves indicate that as a rule, blood sugar falls below the basal value after work is begun, and with cessation of work or even earlier rises again. There seems to be no connection between the blood sugar value, intensity of effort, and degree of fatigue. With longer, more intensive effort, there may be produced a persistent lowering of the blood sugar value, even in the recovery period. A diminished glycogen content is responsible for this decrease. Experimental results show that the majority of theories advanced up to now for the explanation of blood sugar regulation during bodily activity are based on false assumptions and are not valid. Some of the factors which probably are responsible also for the height of the blood sugar value are emphasized.—A. M.

CONTRIBUTIONS TO THE PHYSIOLOGY OF DIFFICULT PHYSICAL ACTIVITY. II. BODY TEMPERATURE DURING AND DIRECTLY AFTER WORK. *E. H. Christensen. Arbeitsphysiol., March, 1931, vol. 4, pp. 154–174.* (*Translation of Author's Summary.*)

Body temperatures during and directly after work were determined on three subjects in sixty-six experiments. The work, which was performed on a Krogh bicycle ergometer, varied between 720 and 1,920 kg.m. per minute, the oxygen consumption between 2 and 4.7 liters per minute. The work lasted from eighteen to ninety minutes.

1. We believe it can be shown that the temperatures measured come very close to the general blood temperature and do not depend on a purely local temperature rise: (*a*) Simultaneous determinations on different, widely separated places in the rectum during and after work show the same temperatures. (*b*) Arm and leg work with a like oxygen consumption per minute exhibit the same increase in temperature. (*c*) Following great energy expenditure, the body temperature thirty minutes after cessation of work remains above 38°.

2. As the metabolic rate increases, the rise in temperature is greater accordingly.

3. The increase varied with different subjects.

4. With tasks approaching the limits

of output of the subject, the elevated body temperature is one of the essential factors determining the duration of the work.

5. The increased metabolic rate occurring with fatigue may be produced partly by the increased body temperature.—A. M.

CONTRIBUTIONS TO THE PHYSIOLOGY OF DIFFICULT PHYSICAL ACTIVITY. III. GAS ANALYTIC METHODS FOR THE DETERMINATION OF THE HEART MINUTE-VOLUME DURING REST AND DURING WORK. *E. H. Christensen. Arbeitsphysiol., March, 1931, vol. 4, pp. 175–202.* (*Translation of Author's Summary.*)

1. The methods based on Fick's principle are theoretically correct but the experimental technic is complicated and time consuming, and it is very difficult to complete the determinations under strictly basal conditions.

2. The nitrous oxide analyses are too slow to be practicable.

3. The ethyl iodide method must be considered as totally unsuited for the determination of the circulation rate (*i. e.*, the minute-volume of the heart). The support of the method is completely repudiated on the basis of only seemingly correct results.

4. The acetylene method is theoretically unobjectionable.

5. The completion of an experiment demands little of the subject.

6. Since the experiment lasts at rest less than half the circulation time, one may count on absolutely basal conditions.

7. The total time of the experiment is brief; the duration of an experiment—including the determination of oxygen absorption, analyses of both air samples, and computation—is from forty to fifty minutes.

8. All the experimental technic is comparatively simple; however, the experimenter must comprehend methods of gas analyses.

9. The entire apparatus is inexpensive and easily transported.

10. Accordingly, the acetylene method must be considered as the most suitable existing method for the determination of the circulation rate of men at rest and during bodily work. —A. M.

EFFICIENCY AND FATIGUE. *I. Fisher. Arbeitsphysiol., March, 1931, vol. 4, pp. 109–127.* (*Translation of Author's Summary.*)

Experiments on the measurement of energy consumption were made with a Benedict apparatus and at the same time with an arm ergograph.

Efficiency early in the experiment is measured under constant mechanical conditions only by the length of the contraction time and is independent of the length of the pause between two contractions.

Fatigue, measured during diminution of work, is only slightly dependent on the contraction time, but is dependent to a great extent on the length of the pauses.

Impairment of efficiency in the course of fatigue is determined by the length of the pauses.

In practice, therefore, it may be expedient to shorten the optimal contraction time, in order to gain as long a pause as possible. The optimal contraction time should never be exceeded.

In work on the ergograph, decrease in lifting height due to fatigue is counterbalanced by the increase in

energy consumption, so that energy consumption per work motion remains constant in spite of the onset of fatigue.—A. M.

CLIMATE

ATMOSPHERIC POLLUTION ANALYSIS 1927–29 (IN CLEVELAND, OHIO). *H. W. Green. Abstr. as follows from U. S. Pub. Health Engin. Abstr., April 11, 1931, vol. 11AC, 2, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4075.*

The solid particles deposited from the atmosphere during each of twenty-four months were collected at ten sampling stations in Cleveland. The deposit was examined for total deposit of carbon, ash, and ferric oxide. Meteorologic data were also kept and used in interpreting the data obtained. In downtown Cleveland the deposit amounted to 1,400 tons per square mile per year. Improvement in the amount of total deposit from year to year is noted.

PHYSICAL CHARACTERISTICS OF SUNSHINE AND ITS SUBSTITUTES. *C. E. Greider and A. C. Downes. Tr. Illumin. Engin. Soc., July, 1931, vol. 26, pp. 561–571.*

This paper is an investigation into the physics of the radiations received from the sun at two sun treatment establishments, with a view to determining the best characteristics at which to aim when designing therapeutic lamps.

Spectral energy distribution curves are given for the noon sunshine intensities at Springfield Lake, Ohio, and at Cragmor, Colo.; a range of wave lengths from 2,900 ångströms in the ultraviolet to 120,000 ångströms in the infra-red being considered. Curves showing the variations of intensity in these radiations with solar altitude enable the average solar intensities at these places to be determined.

Evidence is quoted to show that in designing sources of artificial sunlight, the importance of radiations other than those in the erythema producing region (2,900 to 3,100 ångströms) should not be overlooked. The "high intensity" carbon arc as used for optical projection furnishes a close imitation of sunlight. Clinical opinion is quoted to show that the solar radiation at noon in winter time and in the morning in summer produces the best effects. The energy spectra of noon fall sunshine and of a proprietary arc lamp are compared and agree well.—T. C. A.

THE BIOLOGICALLY ACTIVE COMPONENT OF ULTRAVIOLET IN SUNLIGHT AND DAYLIGHT. *W. W. Coblentz. Tr. Illumin. Engin. Soc., July, 1931, vol. 26, pp. 572–577.*

The author describes a mist of finely divided particles in cities, which he attributes to the products of combustion from automobiles and oil burners, which stratum can rise to 500 or 1,000 feet and cut off a large proportion of ultraviolet light from the sky.

The difference between direct ultraviolet radiation from the sun and the scattered, but none the less considerable sum total scattered ultraviolet radiation that may reach a patient, placed in the open, from all directions, is pointed out and many references are given.

The very small amount of ultraviolet radiation that can reach an inmate of a room through a window is referred to (Clark). (In the eleventh report of the Industrial Health Research Board, Weston and Adams conclude that there is little likelihood of benefit being obtained from fitting special glass, permeable to ultraviolet radiations, in rooms of English factories having a low daylight factor.)—T. C. A.

INDUSTRIAL ENVIRONMENTAL CONDITIONS

AIR-PRESSURE SURVEYING IN MINES (SEVENTH REPORT OF THE MIDLAND INSTITUTE COMMITTEE ON THE VENTILATION OF MINES). PART I. GENERAL PRINCIPLES AND PROCEDURE. *J. N. Williamson and J. A. S. Ritson.* PART II. PRACTICAL EXAMPLES OF SURVEYS AND INTERPRETATION OF RESULTS. *W. E. Cooke and I. C. F. Statham. Tr. Inst. Min. Engin., June, 1931, vol. 81, p. 313.*

This report is of great practical value to those concerned with the ventilation of mines, in that it describes methods for the most thorough investigation of ventilation energy losses.

In *Part I* the general principles of barometric surveying as applied to mine ventilation are considered; the instruments available for the measurement of absolute air pressure are described, and their suitability for mine ventilation work is discussed; and the general procedure when making an underground survey is described, and the necessary precautions are indicated.

It is concluded that the most suitable barometer for use in transit work underground is a good type aneroid, graduated to 0.01 inch over a range of from 28 to 32 inches (or to 33 inches in very deep mines), provided with a movable index, a movable reading lens, and a pill box level, and calibrated by the National Physical Laboratory. For the base instrument, with which to measure the fluctuations of the atmospheric pressure at a convenient base station (*e.g.*, near the pit bottom) during the period of the survey, the contrabarometer is recommended. The authors are unable to confirm the good reports which have appeared in the German technical press concerning the accuracy of the Askania statoscope.

In *Part II* a full description of an air pressure survey is given, together with details of observations. In addition to the air pressure, the temperature, humidity, and velocity of the air were determined, and the cross section of the airway was measured at each observation point. From these data can be determined the resistance of any section of roadway; the horse power required to pass the air along any such section; the power lost owing to leakage in any section; and the cost of air leakage in various sections, given the total cost of ventilation. This information as to the cost of air leakage enables one to estimate whether it would be worth while to attempt to curtail such loss.

During the discussion of the paper it was mentioned that the survey described effected a considerable financial saving. The district in question was becoming short of air, and as a remedy it was proposed to drive a drift through into another seam. The survey showed that this would be useless, and another

method was adopted. The saving amounted to approximately £700.—T. B.

A Note on the Rise in Temperature of Intake Air. *T. Bedford. Colliery Guardian, July 24, 1931, vol. 143, p. 275.* (*Abstract by author.*)

Air temperatures underground influence the activity of miners; they are influenced by the temperature on the surface, but the more distant the workings from the surface, the less marked is the influence of a given fluctuation in the surface temperature. The cooled zone of rock surrounding the airways acts as a heat reservoir which tends to compensate for variations in the temperature of the air passing down from the surface. Similarly, the walls, and particularly the dust in the intake, act as reservoirs for moisture, thus tending to keep steady the moisture content of the air in distant workings.

At a certain colliery the fluctuations of temperature, moisture content, and total heat content of the intake air at various points with fluctuations at the surface were observed. A rise of 26° in surface temperature was accompanied by a rise of 9.8° near the pit bottom (the shaft depth being 552 yards), and rises of 3.4° and 2.3° respectively at points 2,215 and 2,430 yards from the shaft.

As the surface air contained more moisture, the amount of moisture evaporated in the intake diminished, so that with a surface moisture content of 50 to 60 grains per pound of dry air, practically no moisture was taken up.

The lag in the effect of surface temperature was noted. In the case of the intake near the downcast shaft, the intake temperature was more closely related to the mean surface temperature for the preceding three days than to that at the time of observation. At a distance of 2,215 yards from the shaft the lag was greater, and the mean surface temperature for the preceding fourteen days had a much greater influence than that at the time of observation.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

Measuring the Value of Plant Medical Service. *Service Letter on Indust. Relations, June 30, 1931, N. S. no. 78, pp. 7–8. Abstr. in Personnel Jour., Oct., 1931, vol. 10, p. 221.*

Results obtained through the work of the medical department in one company show substantial savings for the company and also for the employees. Specific services rendered by the doctors and nurses are given, as well as total estimated savings for the company and the employees.

The Doctor and the Factory. *A. J. Lanza. Jour. Am. Med. Assn., Aug. 22, 1931, vol. 97, pp. 509–511.*

This is a brief, very general statement giving the qualifications and, to a certain extent, the opportunities of the industrial physician. It is very nonspecific.—C. K. D.

Nonsurgical Work in Industrial Medicine. *H. W. Newman. Illinois Med. Jour., June, 1931, vol. 59, p. 470.*

SEX DIFFERENCES IN THE PHYSICAL IMPAIRMENTS OF ADULT LIFE. A COMPARISON OF RATES AMONG MEN AND WOMEN, BASED ON 112,618 MEDICAL EXAMINATIONS BY THE LIFE EXTENSION INSTITUTE. *R. H. Britten. Am. Jour. Hyg., May, 1931, vol. 13, pp. 741–770.*

1. The rates of physical impairment are, on the average, higher for women than for men, in spite of the fact that the reverse is true of mortality rate.

2. The most marked excess among women is for thyroid conditions, visceroptosis, edema, adenitis, varicose veins, tenderness in region of gallbladder and appendix, heart conditions, tuberculosis, bronchitis and emphysema, symptoms of nervous state, and hemorrhoids.

3. For a number of conditions, the rates for men are higher than those for women, particularly for casts in urine, deflected septum, and arterial thickening.

4. The age prevalence of physical impairments is generally quite identical for the two sexes.

5. Housewives (largely a married group) show characteristic differences in comparison with the group of gainfully occupied (largely unmarried) particularly with respect to teeth and pharyngeal conditions.—*Author's Summary.*

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

CAUSES OF DEATH BY OCCUPATION. OCCUPATIONAL MORTALITY EXPERIENCE OF THE METROPOLITAN LIFE INSURANCE COMPANY, INDUSTRIAL DEPARTMENT, 1922–1924. *L. I. Dublin and R. J. Vane, Jr. U. S. Bur. Labor Statistics, Bull. No. 507, Feb., 1930, pp. 130.*

This analysis of industrial experience reveals the following facts:

1. Within the same social class the death rates of white male wage earners insured under industrial policies are universally higher than those of females.

2. Their death rates also exceed those prevailing among males insured under ordinary policies in the same company.

3. Differential death rates of various age groups show that this disparity increases year by year up to the age of 54.

These observations seem to justify the conclusion that exposure to industrial hazard is cumulative in its deleterious effects. Compared with workers in nonhazardous employments, wage earners are at a disadvantage in respect to every important cause of death.

There has been, however, a gratifying decline in the mortality of all classes during the past two decades. This improvement in vitality has characterized all the main working ages; but much intensive work remains if advances are to continue.—H. W. S.

DEATHS FROM LEAD POISONING, 1925–1927. *F. L. Hoffman. U. S. Bur. Labor Statistics, Bull. No. 488, June, 1929, pp. 37.*

During the years 1925 to 1927, inclusive, 398 deaths from lead poisoning occurred among adult males in the United States registration area, thir-

teen among women, and ten among children. Over 50 per cent. of the males dying from this cause were painters. Occupational distribution of

TABLE 1.—DEATHS OF ADULT MALES FROM LEAD POISONING IN UNITED STATES REGISTRATION AREA, 1925 TO 1927

OCCUPATION	1925	1926	1927	TOTAL
Painters	75	74	67	216
Laborers	11	7	17	35
Metal workers	7	6	..	13
Lead workers	8	5	9	22
Farmers	5	6	2	13
Commercial	6	2	1	9
Printers	5	2	5	12
Paint manufacturing	3	4	..	7
Miners	3	3	..	6
Electric storage batteries	3	2	..	5
Carpenters	1	3	2	6
Glassworkers	1	2	..	3
Plumbers	1	1	4	6
Potters	..	1	..	1
Miscellaneous	2	7	17	26
Unknown and retired	5	10	3	18
Total	136	135	127	398

the deaths among adult males is shown in Table 1. The small number of deaths in the manufacture of electric storage batteries can be explained only on the ground that lead poisoning in this industry in serious form is very rare, but lead absorption is extremely common. The rarity of deaths among potters is undoubtedly the result of far-reaching sanitary reforms introduced into potteries during recent years. Tables are also given analyzing the deaths according to nativity and geographic distribution.

Details are given of sixteen cases of lead poisoning treated at the Buffalo City Hospital. Statistics are presented from New York State, the United States Navy, the Metropolitan Life Insurance Company, Ohio, New Jersey, and from Great Britain, Canada, Germany, France, Scandinavia, South Africa, and Japan. The final section is devoted to physical measurements of lead workers.

There are "no reasons for believing that the actual decline in industrial lead poisoning is measurably attributable to a decline in the primary production of lead pigments for industrial purposes. Quite to the contrary, there are reasons for believing that a substantial increase has taken place in both mining and manufacturing of lead and lead productions, particularly electric storage batteries, compared with the earlier period covered by the present review."

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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GENERAL

REPORT OF THE ROYAL COMMISSION ON LABOUR IN INDIA. *H. M. Stationery Office, June, 1931.* (*Cmd. 3883.*)

A picture is presented of industrialism in India of today; then recommendations for amelioration are advanced. Two facts stand out: First, the numbers employed in factories and mines are comparatively small; thus out of a population of some 350,000,000, only 1,166,000 are employed in factories and 270,000 in mines. Textile mills, for spinning and weaving cotton and jute, account for nearly 700,000; these industries belong mainly to Bombay and Calcutta, respectively. Secondly, India has not yet faced the problems raised by industrial methods introduced among an agricultural people, and has everything to work out in regard to housing, feeding, and sanitation, as well as in the construction of healthy factory premises. Here and there good schemes have been developed which may serve as examples to others; but for the most part things are bad. Labor migrates from the villages, in search of wages, but contact is maintained; no town living population of factory operatives yet exists. The worker sends his wages home to the village and sooner or later returns there. Meanwhile he

may be housed under appalling conditions, perhaps sleeping in the street or on a veranda; every room in tenement houses of three to four stories contains at least one family. Sanitation does not exist. Light and air do not penetrate. Death rates over 30 per thousand are normal; infant mortality in 1929 was 298 in Bombay, and from 300 to 350 in Madras and Rangoon. Even these data may be understated as statistics are notoriously inaccurate, both in regard to populations and in regard to deaths. Labor on tea gardens raises separate problems with malaria and hookworm rife, while recruits often need free food for several weeks before being physically fit to be set to work. While the task of establishing health and welfare for industrial labor in India is vast, the example of European countries and of America exists whence to copy the best and avoid the worst; suggestions for advance on such practical lines are made. The effect of the future industrialization of India upon the commerce of the world must be considerable.—E. L. C.

HYGIENE IN OFFICES AND MERCANTILE ESTABLISHMENTS. *Kremer and E. Holstein. Abstr. as follows from Beihefte z. Zentralbl. f. Gewerbehyg., no. 20, 1931, pp. v, 61, in Bull. Hyg., July, 1931, vol. 6, p. 536.*

In its twentieth brochure, the German Association for Industrial Hygiene, having its seat in Frankfurt a.M., deals with office hygiene in two parts—medical and physiologic, by Dr. E. Holstein, and technical and administrative by an engineer, Dr. Kremer of the Prussian Ministry for Industry and Trade.

The medical section deals with the injurious effects of occupation in offices and shops and among commercial travelers, laying particular stress on the prominence of affections of the nervous system, especially neurasthenia. Holstein speaks of this as the outstanding complaint. Comparison is made of the sickness rates, disablement duration per case, and deaths per hundred, from an insurance company having 200,000 members (of the class in question) for the year 1929. The disablement duration for males was 19 days and for females 19.9; for diseases of the nervous system it was rather higher among males, being 24.9 for them and 23.9 for females.

A section is devoted to nutrition and food values. The daily food consumption of 300 families worked out at 2,932 calories per head.

The technical section has illustrations of ten-storied commercial buildings, good and bad systems of direct and indirect lighting, suitable working stools and chairs, and a roof garden scene.—T. M. L.

HYGIENE OF WORKSHOPS FOR HEAVY VEHICLE CONSTRUCTION. *J. Müller. Abstr. as follows from Deutsch. med. Wchnschr., 1931, vol. 57, pp. 941–942, in Bull. Hyg., Sept., 1931, vol. 6, p. 679.*

The author goes through the various processes in detail and summary fashion. He takes the view, in the case of coal dust for example, that 50 per cent. of the inhaled dust is kept back by the nasal mucous membrane, two-thirds to nine-tenths of the remaining 50 per cent. passes into the stomach, and about one-twentieth to one-sixth into the lungs, some of which

is again coughed up with the increased mucous secretion. Only the smallest particles, 1 to 10 microns in size, are found in the lungs.

He speaks of the prevalence of chronic catarrh, rheumatism, and lenticular opacities among the men at the Siemens-Martins furnaces, and of nervous symptoms—headache, vertigo, palpitation, cough, etc.—brought on by lacquers and spraying processes.

The light metal electron, often used for making small articles, consists of 80 per cent. magnesium. It easily catches alight when in the form of shavings and combines with the oxygen in water. Hence the shavings must be collected in special pails and be kept dry. Any fire must be extinguished with absolutely dry sand. Even electron dust in the clothing readily catches alight.

Care is also to be taken with Duralumin (aluminium alloy). In its manufacture in the electric furnace from aluminium oxide and cryolite (sodium fluoride and aluminium fluoride), carbon monoxide and hydrofluoric acid are given off. Inhalation of the latter is very irritating to the lungs. Duralumin further must pass through a tempering bath before it can be manipulated. This bath consists of equal parts of potassium and sodium nitrite which melt at about 500°C. Arrangements for removal of fumes must be made. Water and wet articles must not be brought into contact with the bath. Asbestos gloves and aprons must be worn.—T. M. L.

INFLUENCE ON THE HEALTH OF MINERS OF WORK AT GREAT DEPTH. OBSERVATIONS IN THE MINING AREA OF BRAZIL. *F. W. Freise. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 1, pp. 620–633, in Bull. Hyg., Sept., 1931, vol. 6, pp. 678–679.*

The mines in question are the Morro Velho in Lima Nova in the state of Minas Geraes. They have been worked for ninety-five years. The ores raised contain 30 to 40 per cent. of sulphide, 30 to 40 per cent. of carbonate, and 20 to 30 per cent. of quartz. The average composition of the sulphide portion is 28.5 per cent pyrrhotine, 5 per cent. arsenic, 2.5 per cent. sulphur, 0.66 per cent. copper; among the carbonates iron predominates. The ore lies horizontally for 20 to 30 m. at its greatest breadth, and 35 to 65 m. at its greatest length, with gold to the amount of 18 to 21 gm. to the ton. The mine is 2,100 m. deep; on the average 430 men are employed per shift. The average temperature is kept at 37.5°C.

Whites and colored natives are employed; among the former distinction has to be made between white Brazilian natives and European whites. Differences in susceptibility between different races are noted. The utmost possible use is made of mechanical methods.

Thirty per cent. of all cases of illness are due to diseases of the lungs; this is attributed not so much to the admixture of the 19.5 mg. per cubic meter of ore dust as to the sulphur dioxide gas in the air. The workers suffer from inflammation of the mucous membranes of the nose and the ear passages, and from long attacks of coughing and sometimes blood spitting. Some acclimatization takes place. Negroes suffer less than whites. The limit of bearable admixture of

sulphur dioxide the author takes to be 0.85 per cent. (Analyses of the air show as much as 0.68, 0.71, and 0.81 per cent. of sulphur dioxide, with 0.09 and 0.11 per cent. of sulphur trioxide, traces of arsenous oxide, and about 1 per cent. of carbon dioxide.)

The lung diseases could be grouped as: acute inflammation of the lungs, 56 per cent.; acute alveolar emphysema, 27 per cent.; chronic alveolar emphysema, 10 per cent.; congestion of the lungs, 3 per cent.; various types, 4 per cent.

Practically all new entrants suffer for days from sudden attacks of paroxysmal tachycardia coming on sometimes after a few minutes and sometimes after several hours. The whole heart region in the younger workers for a minute at a time remains in a state of flutter, which often involves the trunk together with marked increase in the rate of the heart beat, arhythmia, pulsation of the veins, and feeling of general weakness.

Acute heart weakness may follow after a few minutes' bodily overexertion in a cramped position—thus the author observed this lessened capacity for work on the part of the heart muscle 3,291 times among 388 workmen. Detection of chronic emphysema of the lungs as a cause of heart weakness is now the signal for the removal of the man from work at greath depth. Coffee and an infusion from Ilex paraguayensis are the only permitted drinks; water is strictly forbidden.

Vasomotor paralysis due to arsenical poisoning has been observed in a few cases.

The sulphurous acid greatly increases the flow of saliva and accompanying this is loss of appetite, acid eructations, and obstinate constipation. There is general complaint of distaste for food; this symptom is most prominent among the European immigrants.

At all places where there is contact with compounds of arsenic, pruritus is common among the workmen, especially the negroes. The typical skin malady of the white miner is a secondary rash due to absorption of toxins from the intestines as a result of the obstinate constipation. It is feared because of its sudden onset and the accompanying high temperature and violent itching. Those coming into contact with the sawdust and resins of certain (named) wooden props are almost sure to suffer. Erysipelas is relatively very common among workers in hot and moist places.

The latter part of the article deals with the author's observations on the constitutional changes due to long-continued mine work—*e.g.*, changes in weight, in the circumference of the chest, and in the skin among the different types of workers. In his opinion the negroes are least affected by the mine climate in question, but twenty to twenty-two years is the longest time that anyone can stand it. [This is an original contribution bringing to light unsuspected conditions.] —T. M. L.

OCCUPATIONAL POISONING AND DISEASES IN THE LENINGRAD INDUSTRIES. *A. D. Vorobeitchikov. Abstr. as follows from Arb. wiss. Forsch.-Sekt. Leningrad. Abt. Arbeitsschutzes, 1927, vol. 1, part 2, pp. 394–408, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4071.*

This is a brief review.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

PROTECTION AGAINST RESPIRATORY POISONS. *K. Wollin. Abstr. as follows from Gasmaske, 1931, vol. 3, pp. 24–37, in Chem. Abstr., July 20, 1931, vol. 25, p. 3744.*

Respiratory poisons are defined as poisons which enter the system through the respiratory organs and include dust, smoke, fog, vapors, and gases. Adequate protection depends upon other conditions, but the protection chosen should not be more complicated than necessary. A thorough knowledge of the subject is necessary for an intelligent choice of gas mask for a particular purpose, and it is the purpose of the article to supply this background. Various types of gas masks are described and the degree of protection which they offer against various poisons is given. The article is well illustrated; it shows the different types of gas masks and the principles of filtration for different types of poisons.

THE PROTECTION OF THE WORKER AGAINST DUSTS AND GASES. *F. Schoofs. Rev. d'hyg., Dec., 1930, vol. 52, pp. 909–912.*

THE DETECTION OF EXPLOSIVE GASES IN TANKS AND LIQUID CONTAINERS. *F. Pactner. Abstr. as follows from Petroleum Ztschr., 1931, vol. 27, pp. 34–36, in Chem. Abstr., Sept. 10, 1931, vol. 25, p. 4709.*

Three instruments are described, all based on the principle that when air containing gases capable of burning is brought into contact with a glowing platinum wire the temperature is raised, with a consequent rise in resistance to the passage of a current through the wire. The change in current is then measured by means of an ammeter.

FIRE PREVENTION IN CHEMICAL PLANTS. *C. W. Johnson. Chem. Markets, 1931, vol. 29, pp. 49–55.*

ESTIMATION OF ANILINE IN THE AIR. *G. V. Pigulevskii and L. N. Petrova. Abstr. as follows from Arb. wiss. Forsch.-Sekt. Leningrad. Abt. Arbeitsschutzes, 1927, vol. 1, part 2, pp. 310–314, in Chem. Abstr., Sept. 10, 1931, vol. 25, p. 4490.*

The air is passed through a calcium chloride tube 20 cm. long which is fitted with 5 to 6 gm. of glass wool and 10 per cent. sulphuric acid. In some experiments the Tistchenko type of flask was used. The determination of the aniline absorbed by the sulphuric acid was accomplished by the method of Lehmann. The use of the calcium chloride tube instead of the Palmer tube or the Tistchenko flask has the advantage of allowing a rapid passage of the aniline-saturated air.

ARSENIC EXANTHEMS IN ACUTE AND CHRONIC ARSENIC POISONING. *K. Ullmann. Klin. Wchnschr., Aug. 15, 1931, vol. 10, p. 1544.*

ARSINE POISONING IN SMELTING INDUSTRIES. *H. Koch. Abstr. as follows from Metall u. Erz, 1931, vol. 28, pp. 429–432, in Chem. Abstr., Nov. 20, 1931, vol. 25, p. 5882.*

This is a discussion of the properties of arsine, its production in smelting

operations, and means of protection against it.—P. D.

THE DETERMINATION OF BENZINE IN THE AIR BY MEANS OF SILICA GEL. *G. V. Pigulevskii and A. K. Yakovtzeva. Abstr. as follows from Arb. wiss. Forsch.-Sekt. Leningrad. Abt. Arbeitsschutzes, 1927, vol. 1, part 2, pp. 306–309, in Chem. Abstr., Sept. 10, 1931, vol. 25, p. 4491.*

Air was passed through a Tistchenko flask containing sulphuric acid (drying flask), then through a soda lime tube and two calcium chloride containing tubes, and finally a tube containing phosphoric anhydride. The air was then passed through a U-shaped tube containing a weighed amount of benzine. The air saturated with benzine vapor was then passed through two U-shaped tubes containing silica gel and again through a Tistchenko flask. Seven determinations are recorded, each with a total volume of 40 liters of air. The percentage of vaporized benzine absorbed by the silica gel from the air varied between 94.86 and 99.91. Two of the tubes containing silica gel were used twice and two three times. It is suggested that no more than three absorptions be performed with the same reagent. Used silica gel can be freed from the benzine by heating it to 100° and passing purified air for one-half hour. A portable apparatus for use in factories and manufacturing establishments is described and a photograph shown.

NEUROLOGIC AND PSYCHIC PHENOMENA FOLLOWING POISONING WITH CARBON BISULPHIDE. *K. Bonhoeffer. Abstr. as follows from Monatschr. f. Psychiat. u. Neurol., April, 1930, vol. 75, p. 195, in Arch. Neurol. and Psychiat., Aug., 1931, vol. 26, p. 430.*

The clinical pictures presented by fourteen patients suffering from poisoning with carbon bisulphide are summarized in this article. The most frequent and characteristic symptoms were headache, dizziness, and weakness, accompanied by irritability and sleeplessness. Vague complaints referable to the stomach were common. In nine cases symptoms of a neuritic nature were observed. They consisted mainly in complaints of paresthesias, numbness, pains, and muscular cramps. Increased sensitiveness to pressure over the nerve trunks and muscles occurred frequently, but gross neurologic signs were lacking. Three patients showed retrobulbar neuritis. Hearing was impaired in two cases. This was considered to be due to toxic injury of the auditory nerves. An acute psychosis characterized by impaired orientation, defective memory, rapid swings of mood, and auditory and visual hallucinations developed in one patient. Complete recovery took place within five days. Thirty-six per cent. of the patients exhibited hysterical phenomena which were apparently related to the question of compensation. The prognosis in regard to the neuritic symptoms is favorable. Permanent psychic defects were not observed.

CARBON MONOXIDE POISONING AND THE CENTRAL NERVOUS SYSTEM. *E. Pollak and P. Rezek. Abstr. from Arb. a. d. Neurol. Inst. a. d. Wien. Univ., Oct., 1930, vol. 32, p. 95, in Arch. Neurol. and Psychiat., Oct., 1931, vol. 26, pp. 849–850.*

This contribution is based on five cases of carbon monoxide poisoning, three of which occurred in children aged 4, 5, and 6 years and the other two in adults aged 24 and 60 years.

If one compares the pathologic changes in the brains of children with those in the brains of adults, one finds that the chief differences are the occurrence of infiltrations in the walls of the blood vessels, hemorrhages and an intact perivascular tissue, and perivascular necrosis with only slight or no infiltrates in the blood vessels of the children. It would thus seem that in the adult, poisoning with gas produces early degenerative changes in the perivascular tissue, with disturbance in the water content giving rise to edema and necrosis of the lacunar tissue. In view of all these facts it becomes obvious that early death from carbon monoxide poisoning reveals pathologic changes that differ greatly from those in patients who die late, and that the age of the patient determines the character of the morphologic process.

For detailed description of the histologic findings, see the *Archives of Neurology and Psychiatry*.—E. O.

VOLUMETRIC DETERMINATION OF CARBON MONOXIDE BY MEANS OF A SUSPENSION OF IODINE PENTOXIDE IN FUMING SULPHURIC ACID. *H. A. J. Pieters. Abstr. as follows from Chem. Weekbl., 1931, vol. 28, pp. 335–337, in Chem. Abstr., Aug. 20, 1931, vol. 25, p. 4200.*

Results are given of a number of analyses of air containing carbon monoxide as well as of illuminating gas by oxidation with a suspension of iodine pentoxide in fuming sulphuric acid containing 10 per cent. free sulphur trioxide. The method is quick and accurate to 0.02 per cent. of carbon monoxide.

DETERMINATION OF SMALL QUANTITIES OF CARBON MONOXIDE WITH THE IODINE PENTOXIDE METHOD. *A. Danielson. Abstr. as follows from Tek. Tid., 1930, vol. 60, Kemi, pp. 5–8, in Chem. Abstr., Aug. 20, 1931, vol. 25, p. 4200.*

A review of the importance, theory, accuracy, and limits of the method is given with a description of purification of reagents, apparatus, and procedure for best results.

MICROANALYSIS OF CARBON MONOXIDE BY MEANS OF PLATINIZED ASBESTOS. *M. K. Grodzovskii. Abstr. as follows from Izvest. Teplotekh. Inst., 1930, no. 6–7, pp. 44–54, in Chem. Abstr., Sept. 20, 1931, vol. 25, p. 4816.*

Small quantities of carbon monoxide in air were determined by adsorption in asbestos covered with platinum black. The apparatus and procedure are described in detail.—P. D.

RISKS CONNECTED WITH ELECTROPLATING WITH CHROMIUM. *A. Langelez. Bruxelles-Méd., Sept. 6, 1931, pp. 1301–1303.*

Spray is carried into the air by free evolution of hydrogen from the cathode when the current is passed through a plating bath containing chromic acid. This spray is composed of drops of the acid which attacks the exposed skin, the conjunctiva, and nasal mucous membrane of the workers. The skin is reddened, and any slight abrasions on the knuckles, between the fingers, or near the nails, become indolent and

painful ulcers or chrome holes. Gloves do not protect usefully; the skin must be smeared with grease before work and carefully washed after work. The exposed conjunctiva becomes brown, and corneal ulcers may form; goggles should be worn. The mucous membrane of the nasal septum is attacked until the septum necroses and perforates; the nasal orifices should be plugged with wool soaked in paraffin, and mouth breathing should be encouraged. Steps should also be taken to capture and remove the spray by exhaust ventilation. The author places too much stress on personal protection, and too little on ventilation which should render other protection unnecessary by removing the hazard.—E. L. C.

LEAD POISONING IN BRASS AND BRONZE FOUNDRIES. *F. G. Pedley and R. V. Ward. Abstr. as follows from Canadian Med. As n. Jour., Sept., 1931, vol. 25, pp. 299–303, in Jour. Am. Med. Assn., Oct. 31, 1931, vol. 97, p. 1332.*

Pedley and Ward report that thirty-eight men engaged in the founding of high lead bronze were sent to the Montreal General Hospital for various complaints. Twenty-four of these were found to be suffering from acute lead poisoning, nine others showed definite evidence of lead absorption, and only five showed no signs of plumbism. Three brass polishers who succeeded one another on the same emery wheel became poisoned with lead. Blood smears of twenty-six men engaged in the polishing of low lead brass and bronze (less than 6 per cent.) were examined. Five of these showed stippled cells, well in excess of 200 per million red cells. The analysis of air in one foundry showed the concentration of lead in the air to be about 0.85 mg. per cubic meter. The authors' review of the literature of chronic brass poisoning indicated that many cases of chronic disability occur among founders and polishers of brass, and that the symptoms recorded are closely allied to those of lead poisoning. It is their belief that lead plays an important part in the disease picture variously diagnosed as brass poisoning, bronze poisoning, and copper poisoning.—C. K. D.

MICROCHEMICAL METHODS FOR THE ESTIMATION OF LEAD DUST IN MANUFACTURING ESTABLISHMENTS. *K. P. Khokhryakov. Abstr. as follows from Arb. Leningrad. Inst. Gewerbehyg., 1930, vol. 3, no. 4, pp. 13–26, in Chem. Abstr., July 20, 1931, vol. 25, p. 3590.*

In the absence of members of the third group the colorimetric method using the "Arnold-Menzel-Trillat" reagent is recommended. An error as high as 20 per cent. occurs in the presence of the metals of the third group. Most accurate results are obtained when the lead is determined as one of the following salts: lead iodide, lead chromate, and lead potassium copper hexanitrite. The size of the dust particles was determined by the method of Carphine.

THE CLINICAL PICTURE AND PATHOLOGY OF MERCURY POISONING. *W. Guiljarowsky and A. Winokuroff. Abstr. as follows from Ztschr. f. d. ges. Neurol. u. Psychiat., 1929, vol. 121, p. 1, in Arch. Neurol. and Psychiat., Aug., 1931, vol. 26, pp. 404–405.*

Guiljarowsky and Winokuroff report

seven cases of poisoning caused by mercury; they occurred in two families. Two brothers, both married, began in September, 1925, to do piecework in the preparation of thermometers with the help of three unmarried brothers. The work was carried out in two badly ventilated homes, only one of which had a window for ventilation. The symptoms of poisoning first appeared in the family occupying the latter home. The three unmarried brothers who took part in the work did not sleep in the homes where the work was done, and the mercurial poisoning did not develop in them. After work, the glass and mercury were thrown on the floor and rarely cleaned out.

The families of the two married brothers were affected. In the first family, mercurial poisoning appeared in the father, mother, and two children, aged 5 and 3 years. The father became ill with stomatitis, colitis, neuritis, tremors of the hands, pains in the head and neck, and nervousness. He showed a rather slurring speech, emotional lability, loss of memory, difficulty in concentration, and a definite hypochondriacal trend. The pupils were sluggish; there were tremors in the region of the orbicularis oris, perseveration of movements, such as opening the mouth or closing the eyes, marked hyperactivity of the patellar reflexes, a Romberg sign, and a definite disturbance of speech. He complained constantly of the fact that his tongue did not belong to him. The mother, aged 28, became ill one month after her husband with stomatitis, headaches, insomnia, nervousness, and a definite feeling of anxiety. She showed only a tremor of the hands and of the closed eyelids, and a depressed right knee reflex. The children became ill about four months after the mother. In the elder, aged 5, a bright, quiet youngster, fever developed, and he complained of pain in the stomach. He had diarrhea and blood in the stools. After a week in bed, he was very thin, dropped objects from his hands, showed tremor of the hands, became mentally deficient, showed disturbances in consciousness, soiled himself, played with his genitals, and became definitely imbecilic. He showed dilated pupils, limitation of movements of the eyeballs in all directions, divergent strabismus, bilateral ptosis, spasmodic blinking, spasticity of the facial muscles, spasms of the muscles of mastication and sometimes of swallowing, hypotonia of the lower extremities, a gait with a wide base, hyperactive knee reflexes, and loss of control of the bladder and the rectum. There was 42 per cent. of mercury in the blood. He was much below par mentally. His sister, aged 3, became ill at the same time and with similar complaints. She showed a marked horizontal nystagmus, strabismus, left hemiparesis, hypotonia, and marked weakness of the upper extremities with periodic spastic phenomena. She also had spasm of the muscles of mastication, fibrillary twitchings of the face, especially about the eyes and the mouth, isolated twitchings in the extremities, a dysbasic gait with a wide base, hyperactive patellar reflexes, and a Babinski sign on the left. Mentally, she exhibited marked anxiety, defects of speech, and a decreased mentality.

In the second family, the mother and three children, aged 7, $2\frac{1}{2}$ years,

and 6 months, were taken ill simultaneously. The mother complained of pains in the gums, diarrhea, nervousness, headaches, marked anxiety, and a tendency to cry easily; she worried frequently. She showed a mask-like facies, ptosis, divergent strabismus, paresis of the orbicularis oris, trismus, weakness and hypotonia of the upper extremities, tremor of the hands, anisocoria, and marked emotional instability, but no loss of mental powers. The father showed no evidence of poisoning. The girl, aged 7, became ill with headaches and loss of power in the upper extremities. She showed anisocoria, twitchings of the facial muscles, a definite weakness of the left side of the face (peripheral), a relative weakness of the left masseter, a more pronounced weakness of the left temporal muscle, spasticity of the fingers of the right hand, intention tremor, and choreo-athetotic movements. There were an insignificant rigidity of the extremities, loss of motion of the arms in walking, an ataxic gait (mild), and aphasia. She showed a definite decrease in mental power. The blood showed 38 per cent. of mercury, and mercury (0.06 mg.) was present in the urine. The younger child became ill with similar symptoms. She showed an ataxic gait, hypotonia of the upper extremities, disturbances in equilibrium, and intention tremor. Mentally, she was dulled, and showed an extreme anxiety. Mercury was recovered in the urine (0.04 mg.). The youngest infant, aged 6 months, showed numerous furuncles but few neurologic symptoms. She died, and a necropsy was obtained.

Study of the fatal case showed proliferation of the connective tissue, the vascular endothelium, and the cells of Schwann, and swelling of the myelin sheaths in the peripheral nerves. The sympathetic ganglia showed shrunken cells in the process of neuronophagia, with the neurofibrils either absent or much broken up. The brain showed hyperemia, with numerous hemorrhages in the cortex. Changes in the cortex were most marked in areas 8, 7, 19, and 22. There were thickening of the pia, infiltration with lymphocytes and macrophages, numerous venous thromboses, central chromatolysis of the cells of layers 3 and 5 in the cortex and fat either in the perivascular spaces or in gitter cells, especially in the deeper layers of the cortex. There were small hemorrhages in the cornu ammonis and vessels filled with streptococci. The basal ganglia showed destruction of the cells of the lenticular nucleus, with a marked increase in the satellite cells. The thalamus was normal. The ependyma of the third ventricle was hyperplastic. The cord did not show changes. In isolated cells of the anterior horn one could see mild chromatolytic changes. The vessels often showed marked endarteritic changes, and in the cortex in some areas streptococci were found in the vessels. Proliferative neuroglial changes were present.

The changes in the brain were more marked in the subcortical ganglia than in the cortex. Two factors played a rôle: intoxication and infection. Of these, the intoxication was by far the more important, the infection being purely secondary. It is known from experiment that mercury decreases the resistance of the organism and makes infection easy.

It is hard to say from this case just what the changes due to mercurial poisoning are. A case of mercurial poisoning was reported by de Crinis in a man, aged 20, who took sublimate and died eleven days later. Necropsy showed tigrolysis of the cells of the central and frontal areas and of the cornu ammonis, with swelling of the cells and increase in satellite cells. Most of the changes were in the third layer. There was also hyperplasia of the fibers and neuroglia. Guiljarowsky and Winokuroff state that mercurial poisoning causes marked dementia, with changes in character consisting of querulousness, fear and anxiety reactions, and depression.

MERCURIAL ENCEPHALOPATHY: ITS COURSE AND PROGNOSIS: THIRTEEN CASES. *A. J. Kulkov. Abstr. as follows from Kazansky med. jur., March, 1931, vol. 27, p. 262, in Jour. Am. Med. Assn., July 25, 1931, vol. 97, p. 291.*

Kulkov observed thirteen cases of mercurial poisoning and reaches the following conclusions: (1) The differences in the course of mercurial encephalopathy in adults and in children are mostly due to the great severity with which mercury affects the child. This is why the subsequent picture of the illness is much more grave in children. Evidently, the destructive processes which have been provoked by the poison progress so far that that there develops a definite limit to real improvement. In a large part this phenomenon is connected with the general mental inferiority of the child and the defects in his speech. Mutism, indeed, in most of the patients disappears, but the speech always remains remarkedly defective. Thus, the course of the disease as well as the prognosis is rather unfavorable. (2) The course of the disease in adults is satisfactory as long as the patient quits his work with mercury. But even in such cases a great deal depends on the person affected. In one case observed, the patient worked with mercury for only two days and got sick, while the rest of the workers became ill in a period of months. The patient's return to work with mercury will not necessarily lead to a recidivation. (3) The laboratory investigations bring out that the gravity of symptoms in mercurial encephalopathy is, evidently, due to the storage of mercury in the system. When elimination of mercury begins, the clinical picture shows rapid improvement.—C. K. D.

PRINCIPLES OF SELF-ACTING FIREDAMP ALARMS. *H. F. Coward and C. S. W. Grice. Tr. Inst. Min. Engin., June, 1931, vol. 81, p. 350.*

The paper gives a discussion of those properties of fire damp which can be utilized in the devising of self-acting detectors, and various fire damp indicators are described.

After a survey of possible methods of constructing a fire damp alarm, the conclusion is reached that the flame safety lamp as ordinarily constructed, without the addition of any special device, fulfils to an unrivaled degree the principal requirements of an alarm —reliability, accuracy, simplicity, and portability. It has the added advantages of giving light itself, and of being an automatic alarm for black damp.

A useful bibliography is given.—T. B.

TOXICITY OF METHYL ALCOHOL (METHANOL) FOLLOWING SKIN ABSORPTION AND INHALATION. A PROGRESS REPORT. *C. P. McCord. Indust. and Engin. Chem., Aug., 1931, vol. 23, pp. 931–936.*

This article is a "progress" report of experiments to add to our knowledge of the poisonous qualities of a familiar substance. It is to be hoped that in final form control observations will have a larger share of the text, since without this change many of the statements made must lose a decided part of their impressiveness.—C. K. D.

PRACTICAL METHODS OF DETECTING AND ESTIMATING METHYL CHLORIDE IN AIR AND FOODS. *M. J. Martinek and W. C. Marti. Indust. and Engin. Chem., Analyt. Ed., Oct. 15, 1931, vol. 3, pp. 408–410.*

Comparative studies of available field tests for methyl chloride in air showed the copper gauze flame test to be the most efficient and rapid.

A study of laboratory methods for the qualitative detection of methyl chloride in miscellaneous samples resulted in developing a practical combustion method which proved satisfactory. It is sensitive to about 50 parts of methyl chloride per million parts of air.

For quantitative work, a modified combustion method was devised in which the methyl chloride gas, diluted with air, is oxidized, and the halogen products of combustion—*i.e.*, the hydrochloric acid gas and the free chlorine and its oxides—are absorbed in a solution of sodium carbonate and arsenous acid. The resultant chlorides are precipitated with silver nitrate and titrated by a very sensitive modified Volhard method, the accuracy of the method being about 50 parts per million. It is applicable to various types of samples, including air, food materials, urine, etc.—*Authors' Summary.*

CHANGES IN THE BLOOD OF RADIUM WORKERS IN JOACHIMSTHAL. *A. Woldrich. Med. Klin., Jan. 2, 1931, vol. 27, p. 17.*

AN INTERESTING CASE OF ROENTGEN CARCINOMA. *H. Yamakawa and K. Shimada. Abstr. as follows from Gann, 1931, vol. 25, p. 1, in Am. Jour. Cancer, July, 1931, vol. 15, pp. 1659–1660.*

This report deals with a man of 51 years, who was employed in an X-ray laboratory for seventeen years. Ten years previous to examination he had on the back of both hands small warts, which he treated with salves. In February, 1926, a small painful ulcer developed on one of the warts on the right index finger. This refused to heal, whereupon the finger was amputated. In July, 1929, a similar painful ulcer developed on the extensor surface of the right middle finger, and the terminal and middle phalanges were amputated. Microscopic examination of the ulcerated surface of the amputated finger showed deeply infiltrating carcinoma. A short time afterward the lymph nodes of the right elbow and axilla became swollen, and these were removed in September. Finally, in the same year, there arose a very painful ulcer on the amputation scar on the right index finger, and more enlarged lymph nodes were noticed in the right supraclavicular region. The ulcer became larger and painful, and

a tumor as large as the end of the thumb appeared in the right breast. In March, 1930, enlarged lymph nodes appeared in the right elbow and axilla. After that date the patient complained of such severe pain in the abdomen and hip that he could hardly move. Later, paresis and hypesthesia of the right lower extremity occurred, and the right patellar reflex was lost. The patient died on April 12, 1930.

At autopsy, tumor metastases were found in the nodes of the right hilum but not in the lungs. Metastases were also found in the heart, liver, submucosa of stomach, spleen, kidneys, left suprarenal, and appendix. The pancreas was cirrhotic and diffusely infiltrated by the tumor tissue and matted together with the stomach, peripancreatic lymph nodes, and other organs. Microscopic examination of the tumor of the finger revealed a medullary carcinoma, closely resembling an anaplastic skin cancer (basal cell carcinoma).

According to the authors, this is the first occupational roentgen tumor to be recorded in Japan.

EXPERIMENTAL TAR TUMORS IN THE WHITE RAT. *A. F. Watson. Abstr. as follows from Jour. Path. and Bacteriol., May, 1931, vol. 34, p. 301, in Jour. Am. Med. Assn., July 25, 1931, vol. 97, pp. 280–281.*

Watson produced skin tumors in two male and two female rats from an original litter of six males and five females by means of the periodic treatment of the skin with a gas works coal tar, each application of tar being preceded by treatment of the skin with a petroleum ether extract of rat tissues. Under the particular experimental conditions adopted, the tumors appeared during the period from 415 to 551 days after the first application of tar. The tumors of the males were squamous cell carcinomas in type and, once initiated, grew vigorously, one animal showing extensive metastases in the lungs, both kidneys, and the pleural cavity. Inoculations of the tumor tissue from these animals into normal rats were unsuccessful. The tumors of the females grew less vigorously and in only one case could any microscopic evidence of local infiltrative growth be obtained.—C. K. D.

COLOR TESTS FOR BENZENE, NAPHTHALENE, ANTHRACENE, PHENANTHRENE, QUINONE, ANTHRAQUINONE AND QUINOLINE. *L. Ekkert. Abstr. as follows from Pharm. Zentralhalle, vol. 72, pp. 51–53; Magyar Gyógyszerésztud. Társaság Értesitöje, 1931, vol. 7, pp. 1–6, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 3934.*

Color tests are obtained by covering 1 c.c. of concentrated sulphuric acid with 1 c.c. of an alcoholic solution of 0.01 gm. of the compound containing 5 drops of a 10 per cent. solution of paradimethylaminobenzaldehyde in sulphuric acid or with nitroso-betanaphthol (0.001 gm.) and then shaking the mixture. Benzene shows wine-red color, which becomes dark brownish red under a quartz lamp. Naphthalene gives a yellowish-pink color, or a dark olive brown under the quartz lamp. Anthracene shows a green color, becoming grayish blue under the quartz lamp. Phenanthrene gives an olive-brown color, becoming grayish blue. Quinone gives greenish black, becoming brownish Bordeaux

red. Anthraquinone gives a brownish-red color. Quinoline gives a light greenish yellow, which becomes brilliant blue under the quartz lamp.

THE REACTION OF THE MACROGLIA AND THE NERVE ELEMENTS TO EXPERIMENTAL POISONING BY HISTAMINE, GUANIDINE, HYDROCHLORIC ACID, LEAD ACETATE AND THALLIUM ACETATE. *C. E. Roberti. Abstr. from Rassegna di studi psichiat., Jan.-Feb., 1931, vol. 20, p. 7, in Arch. Neurol. and Psychiat., Sept., 1931, vol. 26, pp. 641–642.*

Following the report of Ugurgieri on the reactions of the oligodendroglia and microglia in experimental poisoning, Roberti reports his observations on the reaction of the astrocytes and the nerve cells following various types of experimental poisoning. Following lead poisoning, Roberti reports diffuse lesions in the nerve cells represented by the severe type of degeneration. The lesions involve also the Purkinje elements of the cerebellum. The astrocytes also show degenerative changes with a tendency toward clasmatodendrosis. Roberti believes that lead has an elective action for the astrocytes. Lead acetate has been used also by Roberti, and the lesions following the administration of from 8 to 11 cg. of the metal in ten or twelve days are located dominantly in cornu ammonis, in the Purkinje elements, and in some of the cranial nerve nuclei. The nerve cells show chromatolysis, here and there shrinkage and gradual disintegration. The lesions are not severe or diffuse, and the neuroglia does not seem to participate in the process. Rabbits were used in all of the experiments.

DEGENERATION OF THE NERVES DUE TO CHRONIC POISONING FROM SOLVENTS. *G. Lutz. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 1, pp. 740–748, in Bull. Hyg., Sept., 1931, vol. 6, p. 680.*

The author points out that little work has been done on the histologic side as to the effect of some poisons used as solvents—for example, in cellulose spraying and among laboratory workers.

He describes the symptoms of a technical chemist, 50 years of age, who for many years had been engaged in examining samples of such substances as benzine, benzene and its homologues, toluene and xylene, and the aliphatic and aromatic hydrocarbons, drawing the samples up by his mouth through a pipette.

He developed a constant pain in the tongue, and later a heart neurosis and nervous exhaustion. Blood examination showed 4,600,000 red blood cells and 8,300 white blood cells; hemoglobin 77 per cent.; differential count was normal.

Eventually he was classed as a hypochondriacal neurasthenic. The postmortem showed him to be the subject of an atypical tetrachlorethane poisoning—advanced fatty degeneration of the liver, atrophy of all his organs, and almost complete disappearance of fatty tissue. The tongue was dry, with dense hard deposit. The bone marrow was not affected. Evidently chlorine hydrocarbon compounds were the cause of the condition of the liver.

The histologic changes found were, however, more important than those noted at the autopsy. Instead of dense layers of flat epithelium on the

tongue there was but a single layer of cubical cells. The papillae themselves were widened and showed an abundant framework of connective tissue. A section through the tongue also showed marked changes, the aponeurotic layer being two to three times the normal width and consisting mainly of connective tissue which enveloped even the smallest blood vessels. The newly organized connective tissue was extraordinarily full of blood vessels, taking on an almost angiomatous character. Plasma cells were massed together. The nerve cells showed the strangest changes of all. Scarcely a single nerve bundle had a normal structure. The greater part had undergone degeneration and contained larger or smaller vacuoles. The usual fat dyes gave no reaction. Longitudinal sections of the nerve showed the fibers to be thickened with numerous bulgings and ball-like swellings with remains of stainable medullary substance. Often no continuous nerve fiber was visible, the nerve having the appearance of a string of beads with the intermediate binding in solution.

These appearances closely resemble those of simple degeneration or atrophy after section through the peripheral end of a nerve. The author considers it to be purely a degenerative process similar to that known to occur after acute intoxication by arsenic, carbon monoxide, mercury, and chronic poisoning by alcohol and lead.

In this special instance the effect cannot be referred to an isolated substance but must be ascribed to injury of the peripheral nerve by a special group of poisons.

The author finally describes how poisons may enter the system by suction and considers that his findings ought to be a warning to laboratory workers generally to find other means than mouth suction for pipetting.—T. M. L.

NEW VOLATILE POISONS. *H. Zangger. Schweiz. med. Wchnschr., Aug. 8, 1931, vol. 61, p. 748.*

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

PROFESSIONAL ANAPHYLACTIC ECZEMA FROM DYED FUR. HEMOCLASTIC CRISIS. *Gougerot and Poulain. Abstr. as follows from Bull. Soc. franç. de dermat. et syph., May, 1931, vol. 38, p. 762, in Arch. Dermat. and Syph., Oct., 1931, vol. 24, p. 650.*

Gougerot and Poulain report that a patient with occupational eczema in whom dyed fur was shown to be the causative irritant was given scratch and intradermal tests with the offending agent, following which a hemoclastic crisis developed. Examination before the test proved the arterial tension to be 125 systolic and 85 diastolic; erythrocytes numbered 3,500,000 and leukocytes, 6,000. Following the test the arterial tension fell to 100 systolic and 65 diastolic and the number of leukocytes to 4,500. At the same time the cutireaction was slightly red and edematous but there was no local eczema. On later observation, the primary condition was found to be improved with change in occupation.

EXPERIMENTAL OBSERVATIONS ON DERMATITIS DUE TO DYED FUR. *G. H. Percival. Lancet, Aug. 22, 1931, vol. 2, pp. 417–424.*

An extensive series of observations is reported in which the contact eczema test was employed. The occurrence of many cases of fur dermatitis during the last ten years in Edinburgh led up to the research. The dye mainly investigated was paraphenylenediamine (apart from metaphenylenediamine) which is one of the ursol group, well known on occasion to cause dermatitis. The test was appplied to patients who had had fur dermatitis, and also to many others suffering from various types of skin disease. Positive results were obtained only with the former group; none of the others reacted. Nor was it found possible to sensitize any others. But the difference in senstivity between a skin intolerant to the dye and a normal skin was found to be of considerable magnitude. Oxidation of the dye with hydrogen peroxide lessened its powers of skin irritation. The conclusion drawn is that the dermatitis depends on an allergic state of the skin and is idiosyncratic in nature; hence it follows that the dye is not generally toxic for normal individuals. Positive reactions only followed application of the dye to the intact skin, and not by the scratch method. The percentage of allergic individuals is small.—E. L. C.

HYPERSENSITIVENESS TO WOOL FAT. *M. B. Sulzberger and J. L. Morse. Abstr. as follows from Jour. Am. Med. Assn., June 20, 1931, vol. 96, p. 2099, in Arch. Dermat. and Syph., Sept., 1931, vol. 24, p. 455.*

Two cases are reported in which the patients were sensitive to wool fat. Both patients were of the group who "do not do well when treated with ointments." One patient was a salesman of woolen materials, the other a dress designer, and both had eczematous eruptions on the hands and forearms at varying intervals for a number of years. When ointments irritated, patch tests revealed the sensitiveness to wool fat. Under wet dressings the eruptions disappeared.

QUINONE DISCOLORATION OF THE INTERPALPEBRAL AREA OF THE CORNEA AND CONJUNCTIVA AS OCCUPATIONAL DISEASE IN THE MANUFACTURE OF HYDROQUINONE. *J. K. Velhagen. Abstr. as follows from Klin. Monatsbl. f. Augenh., June, 1931, vol. 86, p. 739, in Am. Jour. Ophth., Oct., 1931, vol. 14, pp. 1086–1087.*

Six cases of brown ribbon-shaped discoloration of cornea and conjunctiva in the interpalpebral area are described in laborers who worked in hydroquinone factories. It is caused by paraquinone, which occurs in the form of steam or dust in the factories, and produces numerous gray dots of infiltration with a brownish luster. The epithelium of the cornea becomes uneven, loose, and decays by ulceration, and the sensibility of the cornea is diminished. It is an occupational disease and its prevention demands thorough ventilation.

PARALYSIS OF ACCOMMODATION AND PUPILLARY DISTURBANCES AFTER LEAD POISONING. *N. Blatt. Abstr. as follows from Klin. Monatsbl. f. Augenh., April, 1931, vol. 86, p. 482,*

in Am. Jour. Ophth., Sept., 1931, vol. 14, p. 980.

Despite the great variety of ocular affections which have been reported as due to lead poisoning, relatively little has been said of pupillary changes and especially of alterations in the mechanism of accommodation. Blatt carefully studied 320 clinical histories of lead poisoning, and found only twenty-one cases of pupillary changes and two cases of disturbance of accommodation. He reports the following case.

A man, aged 37 years, whose occupation was installing and welding lead pipes, suffered in 1927 from violent vertigo, colic, vomiting, obscurations of vision, photopsia, and inability to read or write for weeks. All these symptoms disappeared after discontinuation of his work. In October, 1929, he complained of total amaurosis for several minutes, flickering, colic, and vomiting, and his gums showed the blue line of lead poisoning. During temporary amaurotic attacks the retina was very anemic, the optic disk discolored, and the retinal arteries narrow. The pupils, each 5.5 mm. wide, reacted directly and consensually very sluggishly to light and convergence, and had the irregular appearance of a rounded triangle. During the blind attacks reaction was still more retarded. The near point was at 56 cm. instead of 20.2 cm., and the range of accommodation was 1.7 diopters, being a loss of 3.35 diopters. The patient read with a + 2.5 sphere at 30 cm. He gave up his work entirely, was put to bed, and was treated with iodine. On November 21, his condition was greatly improved and one month later all symptoms had disappeared. There had been no recurrence up to September, 1930.

Blatt considers with Elschnig that the obscurations and photopsias in lead poisoning are consequences of spasms of retinal vessels. Endarteritis also occurs in the retinal arteries. If the amaurosis develops gradually and if changes in the fundus and in the optic nerve are present, loss of vision will be permanent. The usual temporary amaurosis is due to irritation of the cerebral vessels. A tabulated synopsis of twenty-two cases reveals thirteen cases of absolute immobility of the pupils with mydriasis, three of reflex immobility, six with pupils of normal size (all of normal shape except three), and three cases of anomalies of accommodation. These changes of pupils and accommodation may be directly due to the toxic influence of lead on the nervous substance or indirectly to hyaline degeneration, endarteritis, and perivasculitis of the vessels with their consecutive disturbances of function.

THE POSSIBLE RELATION OF STRONG LIGHTS IN THE MOTION PICTURE INDUSTRY TO LENS CHANGES. *L. Mills. Am. Jour. Ophth., Sept., 1931, vol. 14, p. 917.*

Of forty-nine men, between ages 24 and 45, engaged in the motion picture industry for periods of from six to fourteen years, thirty-nine had normal lenses, six had vacuolation of lenses, and four had cortical cataract. Exposure to strong lights used in the industry is suggested as a causative factor.

HISTOLOGIC CHANGES OF THE DETACHED LAMELLA OF THE ANTERIOR

CAPSULE (FIRE DETACHMENT) OF BLACKSMITH'S AND GLASSMAKER'S CATARACT. *A. Vogt. Abstr. as follows from Klin. Monatsbl. f. Augenh., June, 1931, vol. 86, p. 736, in Am. Jour. Ophth., Oct., 1931, vol. 14, p. 1098.*

Before extracting the lenses of two fire workers who showed in both eyes nuclear and posterior shell cataract with detachment of the lamella of the anterior capsule, Vogt removed from the medium-sized pupil a large piece of anterior capsule with widely opened De Wecker scissors. The lamella was not of the uniform thickness expected from the clinical aspect, but its thickness by far exceeded that of the exfoliated senile lamella, whereby some differences between the two clinical pictures are understandable. Hence the continuity of the lamella of fire workers, which hangs intact in the aqueous, while the much thinner senile exfoliation lamella tends to decay and disintegrate. The intense striation of the fire lamella indicates probable damage of the single lamellae and their cement substance by radiation or heat.

A PRACTICAL FOREIGN BODY NEEDLE. *Haas. Abstr. as follows from Klin. Monatsbl. f. Augenh., April, 1931, vol. 86, p. 515, in Am. Jour. Ophth., Sept., 1931, vol. 14, pp. 992–993.*

The needle is curved, which allows it to be inserted under the foreign body in the cornea. Alypin is recommended for anesthesia instead of cocaine, which softens the eyeball and injures the epithelium.

COMMON CONDITIONS IN INDUSTRIAL OPHTHALMOLOGY. *G. J. Dublin. New Jersey Med. Soc. Jour., Sept., 1931, vol. 28, p. 704.*

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

EXPLOSIONS OF VESSELS AND APPARATUS IN MANUFACTURING ESTABLISHMENTS AND METHODS FOR THEIR PREVENTION. *L. Gedeonov and V. Krukorskii. Arb. Leningrad. Inst. Gewerbehyg. u. Sicherheitstech., 1928, vol. 2, no. 3, pp. 231–239.*

EXPLOSION IN THE MUNITIONS FACTORY OF THE RHEINISCH-WESTPHÄLISCHEN SPRENGSTOFF A. G., NÜRNBERG. *Abstr. as follows from Ztschr. f. d. ges. Schiess- u. Sprengstoffw., 1931, vol. 26, p. 170, in Chem. Abstr., Aug. 10, 1931, vol. 25, pp. 4127–4128.*

The explosion occurred in a building devoted to the drying and screening of *lead trinitroresorcinolate.* About 8 kg. of this compound was on hand, of which only 3 kg. was dry. The cause of the explosion was probably careless handling of the dry explosive. Two operators were killed.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

STUDIES ON EPITHELIAL PHAGOCYTOSIS—I. *H. M. Carleton. Proc. Roy. Soc. London, Series B., April 2, 1931, vol. 108, pp. 1–10.*

Evidence is given from experimental facts in support of the idea that various epithelial cells are capable on appropriate stimulation of carrying

on phagocytosis, even though they may not be detached from the epithelial surface to which they belong. Phagocytosis is distinct from absorption, such as takes place when fats or oils are taken up by cells. The author thinks that the free border of epithelial cells is sticky with mucus, and that short, blunt pseudopodia may be emitted. The cytoplasm of such pseudopodia engulfs foreign bodies, and carries them within, close to the nucleus. Certain dyes, such as hydrokollag and carmine were used in these experiments, as well as live bacteria. Two illustrative plates show well the contentions of the author.—E. L. C.

THE PHYSIOLOGY OF EXERCISE. V. ACID-BASE CHANGES IN THE SERUM OF EXERCISED DOGS. *H. A. Rice and A. H. Steinhaus. Abstr. as follows from Am. Jour. Physiol., 1931, vol. 96, pp. 529–537, in Chem. Abstr., Aug. 20, 1931, vol. 25, p. 4305.*

Dogs doing strenuous exercise on a tread mill develop a more alkaline blood plasma with lower carbon dioxide tension and lower bicarbonate. Dogs swimming in water at around 40° show about the same effects; but when the water is at 20° or lower, carbon dioxide is increased and the plasma becomes more acid. Blood changes in man during ergometer exercise closely parallel those of the dog swimming in water at moderate temperatures.

THE RESPONSES TO WORK ON A BICYCLE ERGOMETER. *E. C. Schneider. Abstr. as follows from Am. Jour. Physiol., 1931, vol. 97, pp. 353–364, in Chem. Abstr., Aug. 20, 1931, vol. 25, p. 4307.*

Measurements of oxygen consumption, pulse, and respiration rates were made on five untrained subjects at different rates of work up to 10,000 foot pounds per minute. The limit of physical effort in two cases seemed to be due primarily to failure of the heart to augment proportionately to the increased demands of the tissues for oxygen. Another limiting factor was indicated in the failure of the oxygen-pulse to increase in the usual degree.

METABOLISM DURING ASPHYXIA DUE TO LACK OF OXYGEN. *D. Cordier, J. Magne, and A. Mayer. Abstr. as follows from Ann. physiol. physicochim. biol., 1930, vol. 6, pp. 615–633, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4036.*

This article discusses relationships between oxygen debt and lactic acid production in anoxemic and recovery periods.

VARIATIONS IN THE ACID-BASE EQUILIBRIUM DURING ASPHYXIAS. *D. Cordier, J. Magne, and A. Mayer. Abstr. as follows from Ann. physiol. physicochim. biol., 1930, vol. 6, pp. 634–667, in Chem. Abstr., Aug. 10, 1931, vol. 25, p. 4036.*

Asphyxia in rabbits due to lack of oxygen causes a profound and lasting acidosis, too severe to be due to lactic acid. In contrast, carbon dioxide intoxication causes a temporary acidosis which rapidly disappears under aerobic conditions. The decreased supplementary oxygen consumption following anoxemia is due to this acidosis, which seems to inhibit gas exchange.

THE EFFECT OF OCCUPATION ON THE GROWTH OF STRONG AND WEAK YOUNG PEOPLE. *L. Schmidt-Kehl. Arch. f. Hyg., Feb., 1931, vol. 105, pp. 245–261.*

Measurements of chest circumference among young apprentices in stimulating and nonstimulating occupations (depending on the amount of physical labor involved) show that after three years of work the chest of the constitutionally strong employed in stimulating occupations was broader than that of the weak likewise employed. In the nonstimulating occupations, on the other hand, the increase in the chest circumferences was found to be less in the strong than in the weak.—L. C. B.

OBSERVATIONS ON RESUSCITATION FROM ASPHYXIA AND PREVENTION AND TREATMENT OF SECONDARY PNEUMONIA BY INHALATION OF CO_2. *Y. Henderson. Brit. Med. Jour., Oct. 17, 1931, vol. 2, pp. 687–689.*

In cases of drowning, asphyxiation, and other accidents, and after surgical anesthesia, the prevention of secondary pneumonia is almost as important as the immediate resuscitation. Inhalation of carbon dioxide mixed with oxygen or with air is the most effective means of stimulating respiration. This inhalation has proved to be also a highly effective preventive—indeed, it is essentially the specific preventive—of the collapse of the lungs which leads to pneumonia. These two advantages have now been demonstrated by experience in large numbers of cases of carbon monoxide asphyxia, drowning, and other accidents. In the asphyxia of the newborn this inhalation is replacing the old brutal and often ineffective methods of swinging, spanking, and dipping. In surgical clinics this treatment is used to counteract failure of breathing under anesthesia, to restore a normal circulation, and especially to prevent postoperative pneumonia.

Respiration is closely associated with the tonus of the muscles, especially of the thorax. Depressed breathing and low tonus permit collapse of parts or the whole of a lung. From this collapse, if infection is present, pneumonia develops. If respiration and muscle tonus are stimulated by inhalation of carbon dioxide, the lungs are kept open and the development of pneumonia is prevented.—*Author's Conclusions.*

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

TYPICAL INDUSTRIAL ACCIDENTS CAUSED BY ELECTRICITY AND THEIR PREVENTION. *K. K. Wolter. Abstr. as follows from Zentralbl. f. Gewerbehyg., Feb., 1931, N. S. vol. 8, pp. 44–49; March, 1931, pp. 75–80, in Bull. Hyg., Aug., 1931, vol. 6, p. 603.*

The author has brought together from the reports of the German factory and mines inspectors for the years 1926 to 1928, inclusive, a number of accidents due to electricity. Sufficient details are given of each one to understand the cause. He divides them up (66 in all) into those due to high tension installation: (*a*) bare wiring, 7; (*b*) cells and switches, 8; (*c*) machines, apparatus, etc., 12; and those due to low tension: (*a*) bare wiring and house connections, 8; (*b*)

machines and apparatus, 10; (*c*) insulated wires and cables, 7; (*d*) portable and hand lamps, 7; and (*e*) lifting apparatus, distributing switchboards, etc., 7.

The high tensions vary from 10,000 to 100,000 volts, and many of the low tensions are at a voltage of 220, but one is at 110. Each accident is treated individually with observations as to its prevention.

[This is a useful paper for those concerned with electrical installations.]—T. M. L.

HAZARD OF LOW VOLTAGE SHOCKS. *H. B. Williams. Jour. Am. Med. Assn., July 18, 1931, vol. 97, pp. 156–158.*

This is a brief and readable warning of the dangers inherent in household voltages. It adds no new facts to the subject.—C. K. D.

EFFECTS OF SUPER-HIGH-FREQUENCY RADIO CURRENT ON HEALTH OF MEN EXPOSED UNDER SERVICE CONDITIONS. *W. H. Bell and D. Ferguson. Arch. Physical Therapy, X-Ray, Radium, Aug., 1931, vol. 12, pp. 477–490.*

Answering the specific question, *viz.*, "What dangers to human health, if any, are likely to result from the use of super-high frequency for radio communication?" our opinion is that from a practical point of view there are none.

In expressing this opinion we are limiting ourselves to the subject as involved in the present and probable future normal exposure of navy personnel and employees either in the development and testing of high-powered transmitting apparatus at the Naval Research Laboratory or elsewhere, and their operation in the service ashore or on board ship wherever installed. That is clearly the navy's primary interest in the matter and the background of the inquiry.

Both directly and by inference we have discussed the degree of exposure in connection with the development and testing of apparatus fabricated at the Naval Research Laboratory. Exposures to induced fields of radiant energy, incident to tuning up and operating installed apparatus, are even less severe in respect to time and intensity. In either case the field is variable and not concentrated and the transmitter sets installed on board ship are somewhat less powerful than that at the Naval Research Laboratory. Moreover, the transmitters in regular service are enclosed in metal cabinets and consequently electrically shielded; whereas the transmitters in the laboratory are held in open experimental constructions and consequently not shielded. In other words, radiations from various parts are suppressed in the one but not in the other, so that exposure to uncomfortable symptoms is much less likely, if at all likely, with service machines.

In regard to the transient discomfort, and hence reduced efficiency of the laboratory force concerned, it may be minimized by attention to certain factors observed in the course of our investigation: (*a*) the removal from the possible induction field of anything which might operate as a second antenna or electrode and thus to intensify and concentrate the field; (*b*) the reduction of testing time to the actually essential and not "idling" the apparatus with personnel nearby; (*c*) the erection of such electrical screens as will not interfere with the work, yet provide the maximum

shielding; (*d*) as far as may be possible, the employment of men on the work with reasonable regard for the temperamental and physical qualifications which seem to reduce susceptibility; (*e*) as far as may be possible, the selection of days for testing which are characterized by atmospheric conditions favorable to body heat regulation, or secure air movement to that end by artificial means; (*f*) as far as may be consistent with requirements, the avoidance of the 50,000,000-cycle frequency (6 meters) which has been suggested as the critical period; (*g*) provision for the distant control of transmitters.

For purposes of future study, it would be useful if the laboratory would keep individual running records of reaction in relation to frequency and intensity of current and time (period) of exposure in the field of the oscillator.—*Authors' Conclusions.*

WOMEN AND CHILDREN IN INDUSTRY

THE HEALTH OF WOMEN AND GIRLS IN INDUSTRY. *A. W. Sanderson. Abstr. as follows from Hosp. Social Service, 1931, vol. 23, pp. 469–484, in Bull. Hyg., Sept., 1931, vol. 6, pp. 676–677.*

A description is given of the personal supervision of workers exerted at Messrs. Cadbury Bros., Bournville. Medical examination on engagement is carried out, and dental supervision is compulsory. Swimming and physical training are promoted, and dysmenorrhea is successfully treated by rhythmic-movement exercises. Sickness and accident invalidities are found to react to direct personal influences, since both vary together, and depend upon mental and physical fitness or unfitness—that is to say, accident incidence is largely governed by the tendency to sickness. Two accepted tendencies are shown, by an unusually good series of charts, to be unnecessary, *viz.:* a great peak of sickness incidence in winter, from January to April, and an excess of sickness among women and girls as against men and boys. These tendencies existed at Bournville until 1926, when efforts were made to enlist the co-operation of the employee and the general medical practitioner, with a study of the individual and his or her requirements. By 1928 both tendencies had almost vanished. Female sickness need not exceed male by more than 10 per cent. Males experience more accidents than females only because their work exposes them to greater risks. In 1929 an influenza epidemic had less effect upon increasing sickness than the previous "normal" winter epidemic.—E. L. C.

FECUNDITY OF WOMEN WORKING IN PRINTING PLANTS. *V. A. Schokhrin. Vrachebnaya Gazeta, April 30, 1931, no. 8, p. 595.*

INDUSTRIAL ENVIRONMENTAL CONDITIONS

ULTRA-VIOLET WINDOW GLAZING. *H. E. Beckett. Dept. Scientific and Indust. Res., Building Res. Bull. No. 8, pp. 13. H. M. Stationery Office, 1930. Abstr. in Bull. Hyg., Sept., 1931, vol. 6, p. 703.*

The conclusion is drawn that ultraviolet glazing is of value in buildings designed specifically for sun treatment, but that in other buildings in which the occupants sit some distance from the windows, it is of little use, particularly if the windows face north. It is essential to sit near the window or in the direct rays of the sun if therapeutic radiation in appreciable quantity is to be received even though the ultraviolet glazed windows may be unobstructed.—G. P. C.

A New Source of Ultraviolet Radiation. *J. W. Marden and M. G. Nicholson. Tr. Illumin. Engin. Soc., July, 1931, vol. 26, pp. 592–601.*

A lamp of the type in which a mercury vapor discharge is initiated by ionization from a glowing filament is described and its electrical characteristics are given. The lamp has a potential difference of approximately 20 volts and is used in series with a ballast resistance, which can be a glow lamp or lamps of the ordinary variety. —T. C. A.

The Mercury Arc in Hygienic Illumination. *L. J. Buttolph. Tr. Illumin. Engin. Soc., July, 1931, vol. 26, pp. 578–591.*

The idea here presented is that of providing industrial illuminating fittings of the approved types with power to supply a biologically active ultraviolet component, the wave length range of this component being taken to lie between 2,800 and 3,200 ångströms.

Believing that good hygenic effects have in the past been traceable to the use of the standard glass tube Cooper Hewitt mercury vapor lamp, a new lamp of this type has been constructed with a tube of special glass permeable to some of the biologically active rays. Curves (by Hughes) are given, showing the antirachitic effects, on chickens, of mercury vapor lamps made of different materials. There are also energy distribution and variation curves, a transmission curve for glasses and reflectivity curves, with others relevant to the subject.—T. C. A.

A Bibliography on Illumination. Report of the Committee on Illumination of the Commercial-Technical Group, Special Libraries Association. *Tr. Illumin. Engin. Soc., July, 1931, vol. 26, pp. 611–663.*

"The Committee on Illumination presents this, its sixth Bibliography on Illumination. It covers references to articles which have appeared in technical periodicals, association proceedings and other current sources from July 1, 1929 to June 20, 1930.

"Previous Bibliographies were printed by the Special Libraries Association for the years 1924–1925, 1925–1926, 1926–1927, 1927–1928, 1928–1929. These were financed with the aid of the Illuminating Engineering Society through the purchase of copies for distribution to its membership.

"Requests for copies of the Bibliography, and inquiries as to where the publications mentioned could be obtained have been received from various parts of the United States.

"From these indications the Bibliography has found a definite place among the literature on Illumination and it is the hope of the Committee that the work will be continued."

To this modest statement might be added that the bibliography com-

prises forty-nine pages and is admirably indexed—the index alone is worth a subscription to the Journal.—P. D.

HUMIDIFICATION OF AIR IN ROOMS. *Wolf. Abstr. as follows from Arch. f. Hyg., June, 1931, vol. 106, pp. 168–183, in Jour. Am. Med. Assn., Sept. 26, 1931, vol. 97, p. 965.*

Wolf first refers to an article by Bürgers and Fleischer, who, after testing a large number of humidifiers, came to the conclusion that with the commonly recommended humidifiers it is impossible to increase the moisture content of the air in a room. He himself had tested several humidifiers at the Dresden Hygienic Institute. By means of hygrometers and psychrometers it was never possible to detect an increase in the moisture content of the air. He was induced to resume his tests by testimony given for a new humidifier by a scientist who claimed that this apparatus would increase the moisture content by about 39 per cent. The efficacy of the humidifier was tested during the different seasons and always in the same room, which had a south exposure. During the winter there was steam heat. The author gives tables showing the results of his observations and he reaches the conclusion that persons who live in rooms with humidifiers have not the slightest benefit therefrom. The good effect that they think they derive from the humidifier is purely suggestive. For healthy persons the use of humidifiers is unnecessary. If for special reasons, such as for certain collections, a room has to be kept moist, a different method is necessary. Humidifiers on heat radiators are, with rare exceptions, ineffective.—C. K. D.

STUDIES ON THE EFFECT OF ENVIRONMENTAL FACTORS ON THE ANIMAL ORGANISM. II. RELATION OF TEMPERATURE TO THE INJURIOUS EFFECT OF HIGH FAT-CONTAINING DIETS. *I. J. Kligler, A. Geiger, and R. Mueller. Am. Jour. Hyg., July, 1931, vol. 14, pp. 38–48.*

1. Rats fed an otherwise normal diet but containing 35 to 40 per cent. of the calorie requirement in the form of olive oil show an inhibited growth curve in comparison with control groups receiving only 12 per cent. of the calorie intake in the form of oil.

2. The injurious effect is particularly marked in those groups kept at a high temperature and low relative humidity. Rats kept at 28 to 30°C. and receiving a high fat containing diet in the form of olive oil manifest a loss of appetite, loss in weight, and soon develop symptoms of avitaminosis. These effects were not noted or were only slight in groups kept at 20° and fed the identical diet and the same daily calorie ration.

3. The addition of an excess of vitamin B in the form of yeast alleviates these symptoms.—*Authors' Conclusions.*

A STUDY OF RURAL SCHOOL VENTILATION IN CATTARAUGUS COUNTY, N. Y. *R. Cole, D. D. Kimball, F. S. Lee, G. T. Palmer, E. B. Phelps, E. L. Thorndike, and C.-E. A. Winslow. Am. Jour. Hyg., July, 1931, vol. 14, pp. 49–78.*

A two and a half year study of air conditions and incidence of respiratory illness among pupils in one and two room rural schools in Cattaraugus County, New York, revealed rather

unsatisfactory results. Overheating was quite general, particularly in rooms heated by the so-called jacketed stove, and there was a very uneven distribution of temperature, both vertically and laterally. Fifty per cent. of the observations in rooms heated by ordinary stoves showed floor temperatures below 60°F.

The incidence of respiratory illness among pupils present appeared to be associated with the type of heating system and the temperature prevailing in the rooms, the optimum temperature being between 70° and 73°F. Rooms heated by jacketed stoves had the highest rates, and the furnace heated rooms the lowest. Rooms heated by ordinary stoves showed intermediate rates. One local factor which appeared to influence such minor illnesses is, in the authors' opinion, overheating or overchilling of the schoolroom.

Respiratory illness of the more serious type, causing an absence from school for one or more sessions, did not appear to be affected by classroom conditions, but was related to seasonal and climatic factors, particularly to the mean outdoor temperature.—C. P. Y.

COMFORT ON THE TRAIN. THE FIRST COMPLETELY AIR-CONDITIONED TRAIN IN RAILROAD HISTORY. *P. E. Lockhart. Aerologist, Aug., 1931, vol. 7, pp. 5–7.*

This is a good description of the Baltimore and Ohio Railroad's air conditioned trains running from New York to Washington.—P. D.

INDUSTRIAL NURSING

OBJECTIVES AND FUNCTIONS OF PUBLIC HEALTH NURSING IN INDUSTRIAL NURSING SERVICES. *Pub. Health Nursing, July, 1931, vol. 23, pp. 346-347.*

In industrial nursing programs as they now exist, more emphasis should be laid on developing a close relationship with all other official and nonofficial social and health activities within the community.

It is desirable that industries should more generally develop an adequate industrial nursing service. To this end encouragement should be given to state departments of health to provide a consultant nursing service. Local public health nursing associations should consider the possibility of extending their services to plants too small to employ a special industrial nursing staff.

MILL TOWN NURSING. *L. P. East. Pub. Health Nursing, July, 1931, vol. 23, pp. 344–345.*

This is an outline of the health program conducted for the Wiscasset Mills, Albemarle, N. C., by two full time graduate nurses. The program is divided into sections covering practically every phase of work which arises —industrial, educational, maternity, infant and child welfare. The population of the mill settlement is about 4,000.

Workers suffering accidents are sent to the nurses at once. If the injury is not serious enough to incapacitate the worker for his regular duties, a dressing is applied and he is instructed when to return for further treatment. In the case of serious injuries, the patient is sent to the proper authority in the mill to be classed as a compen-

sation case, which requires treatment by a physician.

A nurses' home, which includes an office, is supplied by the mill company.

SUGGESTIONS FOR COURSE IN PUBLIC HEALTH NURSING IN INDUSTRY. *Pub. Health Nursing, July, 1931, vol. 23, pp. 347–348.*

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

PSYCHIATRY IN INDUSTRY. *K. E. Appel. Occup. Therapy, Aug., 1931, vol. 10, pp. 207–216.*

Appel cites instances, chiefly from the work of Mayo, Pennock, and Anderson, illustrating what psychiatry has accomplished in industry by adjusting workers to their environment.

THE NERVOUS TEMPERAMENT. *M. Culpin and M. Smith. Indust. Health Res. Board, Rep. No. 61, pp. 46. H. M. Stationery Office, 1930.*

The primary aim of this investigation was to find out the incidence of nervous symptoms in various groups and their mode of expression in work. The subjects, over a thousand in number, which include clerical workers in government departments and commercial firms, factory workers, people in administrative posts, and students, are of both sexes, and range in age from 14 to 60.

It is possible as the result of a single interview to elicit nervous symptoms or tendencies and classify individuals according to the amount and severity of these symptoms. The general validity of the classification is confirmed by its correlation with the dotting test and with independent judgments as to efficiency and capacity for adaptation.

Subjects in one group, those showing obsessional symptoms, stand out from the rest by their excellent performance at the dotting test. This is an unexpected confirmation of a distinction already made clinically and is definite enough to be of value for diagnostic purposes.

The generalized distribution of subjects with nervous symptoms and the specialized incidence of nervous illnesses indicate that the latter are dependent on occupational conditions as well as on predisposition.

EXPERIMENTAL INVESTIGATIONS ON THE INFLUENCE OF RHYTHM ON CONTINUOUS WORK FOR SHORT WORK PERIODS. *H. Düker. Abstr. as follows from Psychotech. Ztschr., vol. 5, no. 4, in Jour. Nat. Inst. Indust. Psychol., July, 1931, vol. 5, p. 414.*

Three subjects took part in an experiment on the effect of rhythm in the performance of simple mental and manual tasks. The tasks were: (1) adding pairs of single-figure numbers; (2) drawing figure 8's to pass through vertical rows of three dots in such a way that the top and bottom loops passed through the upper and lower dots, with the middle dot on the point of intersection. Both tasks were performed (1) at the subjects' own speed; (2) in time with a regular rhythm indicated by a sound-hammer. The subjects worked for ten minutes daily over periods of from six to ten days, using the two methods on alternate days.

Throughout the experiment, out-

put was higher and errors were less numerous with the second method, the difference becoming more marked as the experiment proceeded. Rhythm increased output even when it was not in accordance with the subjects' natural tempo, but at the cost of greatly increased fatigue. When the hammer was adjusted to the subjects' natural speed, all preferred it to "free" time, saying that the rhythm reduced effort by making the work automatic.

The results are in accordance with previous work on similar lines. It should be an interesting and practicable experiment to measure energy expenditure on the two types of work by means of the Douglas-Haldane gas analysis apparatus.

PRACTICE AND FATIGUE IN CONVEYOR WORK. *W. Efimoff, M. Sarch, and J. Krasnikowa. Ztschr. f. angew. Psychol., Feb., 1931, vol. 38, pp. 120–135.*

TIRED WORKERS ARE POOR WORKERS. *C. O. Sappington. Abstr. as follows from Factory and Indust. Management, June, 1931, vol. 81, pp. 971–972, in Personnel Jour., Oct., 1931, vol. 10, p. 220.*

Frequently, unexplained accidents have been caused by employees who have whipped the physical energy of their bodies and their mental reactions past the point of usual physical and mental fatigue. They are then not capable of making mental judgments which are consistent with safety, nor are they able to coordinate movements of muscles with their tired minds. The article considers in detail conditions which lead to chronic fatigue, which in turn causes also irritability, and suggests development of sane appreciation of the values of life, which must be attained if mental and physical disturbances are to be controlled.

CONCERNING THE NECESSARY PHYSICAL FITNESS FOR DRIVING OF AUTOMOBILES. *H. Coppez. Abstr. from Arch. d'opht., April, 1931, vol. 48, p. 254, in Am. Jour. Ophth., Sept., 1931, vol. 14, p. 997.*

The writer believes that an eye examination of professional drivers of automobiles is desirable, but that the requirements should not be too strict. Ocular examination of nonprofessional private drivers is impractical and unnecessary. The insurance companies do not believe that many accidents are caused by imperfect vision of automobile drivers and it has not been shown that the ratio of accidents is less in those countries where physical examinations are made than in countries which have no such requirements.

MONOCULAR TESTING OF THE COLOR-BLIND. *W. R. Miles and H. Beaumont. Am. Jour. Ophth., July, 1931, vol. 14, pp. 636–639.*

Unilateral color blindness, or a distinct difference as to color vision between the two eyes, is rather infrequently mentioned in the literature, and apparently it is the general custom to test both eyes together for color vision. One case of monocular color blindness was discovered by the authors in the testing of twenty-three persons. The Ishihara plates for testing color vision are particularly valuable, and give lower ratings than the Stilling plates because the former contain hidden numbers.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

SOME NECESSARY REFORMS IN COMPENSATION FOR INDUSTRIAL DISEASES. *L. Teleky. Abstr. as follows from Arch. f. soziale Hyg. u. Demographie, 1930, vol. 5, pp. 442–451, 546–551, in Bull. Hyg., July, 1931, vol. 6, p. 535.*

This is a plea that decisions in cases of industrial diseases under the German compensation law should be left to the untrammeled inquiry required of the medical referees. The author refers to the degrading effect of the usual practice of reports by medical men giving diametrically opposed opinions according as they have been engaged and paid for their reports by the solicitors acting on the one hand for the employers, and on the other for the workman. The matter has been brought into prominence in Germany now by the interest aroused by the inclusion since 1925 of a number of industrial diseases in the German Workmen's Compensation Act.

Thus, much space is devoted to the fact that compensation can be obtained only where the silicosis is described as severe, and obviously the standard of deciding what is severe can be made to vary by the medical expert, according as the interests of the workman or the employer are concerned.

It is the same, too, with lead poisoning, skin maladies, and deafness from loud noises. For all of these the author considers it essential that compensation should be given, lasting for a certain length of time, so that other work may be found. He praises the efforts made in Great Britain to deal more completely with the question of silicosis than has so far been done in Germany.

[This plan of confining the decision in cases of industrial disease to whole time, highly qualified specialists is that adopted by the Home Office under the new Silicosis and Asbestosis (Medical Arrangements) Scheme, already issued. Under the scheme a Medical Board is appointed by the Secretary of State for the purpose of making the medical examination and report and giving the medical certificates required. "No report or certificate shall be made or given except with the authority of not less than two members of the Board."]—T. M. L.

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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GENERAL

GENERAL REPORT. *Ann. Rep. Chief Inspect. Factories for 1930. H. M. Stationery Office, 1931, pp. 11–77.* (*Cmd. 3927.*)

Considerable attention was given, as usual, during the year to the question of safety. Owing possibly to trade depression, a slight fall in the total number of accidents occurred, accompanied by a decrease in the number in which sepsis supervened; the figures for sepsis suggest that first aid services in many places are unsatisfactory. Instances are quoted where adoption of safety first methods has reduced frequency rates and severity rates; thus one instance is given of a frequency rate of 3.24 in blast furnaces in 1927 falling to 1.07 in 1930, and another of a severity rate in steel works which was 127 in 1928, becoming 74 in 1930; many other instances are reported. The spread of safety first activities was greatest in those heavy industries where accidents are normally most prevalent. Safety committees have been established widely, and interesting accounts of their activities are presented; not only are accidents inquired into on the spot, but lectures are given on accident prevention, in order to interest workers in their own protection. Instances, nevertheless, can still be quoted of loss of limbs and

life due to sheer carelessness; for example, at an ice factory, a man was caught on a shaft and whirled round, and his body was severed at the waist by his clothing. Not infrequently wilful disobedience is followed by an accident. References are made to several explosions which called for close investigation to ascertain their causation; one, at an oil cake mill, which resulted in eleven fatalities, was due to heating from oxidation of seed and meal containing oil; it occurred in neighboring silos, and led to spontaneous combustion in a large steel silo. Increased use of celluloid calls for increasing care with regard to its use; fortunately few serious fires occurred during the year, but the danger is an ever present one.

Dust extraction in the grinding of cutlery and edge tools is being constantly improved, particularly in the operation of racing or trimming up the grindstones. The silica hazard is diminishing as the grindstones in use are replaced by artificial abrasive wheels. Similarly, at sandblasting operations shot is being increasingly used instead of silica sand. At this last operation, several cases of silicosis came under notice. Other processes where dust removal received special attention were the carding of cotton and the weaving of asbestos, in order to mitigate the risk of cotton strippers' asthma or asbestosis, respectively.

The attention directed in recent years to the importance of good lighting appears to be bearing fruit, and instances are quoted of the beneficial effects of improved illumination in reducing eyestrain and headaches, and simultaneously in increasing output. An instance is given of a steam laundry, where rest pauses were used scientifically, and increased output; but where, when hours were increased in the rush season, a drop of 5 per cent. per worker in hourly output resulted. A tendency is reported in a wide number of industries for the adoption of a five-day week, with cessation on Saturdays; such action is advantageous where pots or acid baths have to be heated up for four hours on Saturday morning, with an undue cost for the output obtained. Generally the hours which the men would have worked on Saturdays are distributed equally over the other days of the week; but various other expedients have been adopted. This five-day system appears to be advantageous to both employers and employed. The two-shift system was also used; but during periods of trade depression its usefulness was not extended. A high standard of welfare provisions continued to spread; the provision of flowers and plants for decoration in factories is not unusual; but an exceptional instance is reported in a boiler works, where the men provide and tend the plants and flowers. The use of wireless is increasing, and tending to supplant the gramophone for music during the dinner hour; in some cases it is provided in the workrooms, and said to be of assistance to the work. Interest attaches to the development of first aid work in the salt curing of herring; in 1930 the treatments at Yarmouth and Lowestoft numbered 49,672, which was approximately a 40 per cent. increase on 1929; the girls doing the work suffered in particular from salt sores.—E. L. C.

REPORT OF THE SENIOR MEDICAL INSPECTOR OF FACTORIES. *J. C. Bridge. Ann. Rep. Chief Inspect. Factories for 1930. H. M. Stationery Office, 1931, pp. 94–122. (Cmd. 3927.)*

Close co-operation has been developed between the activities of the inspectors and research work, which is establishing industrial hygiene as a scientific branch of medicine; a particular instance is the study of industrial pulmonary disease. Two new inspectors have been added to the medical staff.

The figures given for reported cases of occupational disease show some increase for lead poisoning; but the total, 199 in factories, is low, and suggests that risk of lead poisoning is fairly well under control. The largest number of cases are contributed from painters of buildings, who, however, compose the largest population exposed to risk, and the attack rate among them is not particularly high. Attack rates per thousand persons employed are given as 1.1, in the making of white lead; 7, electric accumulators; 6.3, pottery industry; 10.1, lead smelting; and 0.4, house painters.

An interesting instance of multiple epithelioma affecting the right shoulder, neck, and left arm is reported in a man employed in the manufacture of arsenical sheep dip. Trouble arose from the use of aniline oil as a leather stain in boot factories, owing to inhaling vapor from 5-chlor-ortho-toluidine. Tetrachlorethane was found in use as a degreasing agent, which was causing nausea, sickness, and jaundice; less toxic solvents should be substituted. Anthrax continues to occur chiefly among those exposed to hides and skins; but the total number of cases, 24, with four deaths, was not high. Far greater was the number of epitheliomatous cancers of occupational origin which totaled 194, with thirty-six deaths; 82 of these, with twenty-one deaths, occurred among cotton mule spinners; tar distilling contributed 41 cases with one death; patent fuel works 24 with one death, and gas works 23 with six deaths. The exposure, in each industry named, is to distillation products of coal. Dermatitis of occupational origin was carefully watched. Alkalies stood top of the causative agents, with sugar second, oil third, and chrome fourth; while among industries, dyeing and calico printing led, with engineering second, and laboring third.

An investigation of 700 certificates where death was ascribed to fibrosis of the lungs indicated that 241 cases were of occupational origin; of these the pottery trade accounted for 52; sandstone industry, 49; coal mining, 39; grinding industry, 36; ex-South African gold miners, 23; refractories industries, 12; sandblasting, 10; tin mining, 10; and other industries, 10. The occurrence is reported during the year of a number of deaths from asbestosis, most of which occurred among those exposed to dust arising from recognized dusty processes. Removal from the dusty to a non-dusty process apparently may delay for years a disabling fibrosis, but will not postpone it indefinitely; exposure to heavy concentrations of dust for a short period of years causes the appearance, sooner or later, of fibrosis, even though the worker may have left the process in apparently good health. There is evidence that prevention of the disease is possible by strict application of appropriate preventive means.

Investigation failed to disclose symptoms suggestive of benzene absorption in the process of cellulose spraying, which, however, is usually done in cabinets with localized exhaust. The standard of first aid appliances is improving, as the old material in stock before the present statutory requirements became obligatory is coming to an end; but still the provision is far from uniform throughout the factories. An instance may be quoted of the manager of a rag sorting factory, who "only stocked iodine, as there were plenty of rags in the place." Some idea of the medical work carried out in factories, apart from the headquarters staff, may be gathered from the figures, which show that certifying surgeons examined 300,391 young persons for certificates of fitness, of whom they rejected 7,978. While there were, under regulations or special rules governing industries with hazards from lead or other poisonous metals, 267,230 periodic examinations. —E. L. C.

CHAPTER NINE OF THE CENTRAL REPORT OF THE LABOR INSPECTORATE OF THE KINGDOM OF THE NETHERLANDS FOR 1930. *Holland, 1931.*

This chapter in the Central Report of the Labor Inspectorate gives the results of medical inspections made during the year, and of investigations dealing with occupational diseases. Full detail is given of an examination of workmen exposed occupationally to vapors containing benzene, with special reference to the blood pictures found. An inquiry was continued into the occurrence of bakers' eczema. Dusty industries continued to call for attention, and medical inquiries were made among cement workers and sand blasters; X-ray illustrations from such workers are given, which indicate that in Holland, as elsewhere, cement dust is far less injurious than silica dust, such as arises in sandblasting. The chapter concludes by discussing the results of the Silicosis Conference which was held at Johannesburg during 1930.—E. L. C.

SOME ASPECTS OF INDUSTRIAL OCCUPATIONS WHICH SPECIALLY CONCERN THE MEDICAL OFFICER OF HEALTH. *E. W. Hope. Jour. State Med., Sept., 1931, vol. 39, pp. 537–543.*

Factory legislation preceded public health enactments in England, and demonstrated the need of insistence to obtain compliance with legislation. Such compliance is enforced by Factory Inspectors; but certain matters affecting the general public are outside their activities, and call for the attention of Medical Officers of Health. Such officers may forbid work being given out to be done in a house where there is a case of notifiable infectious disease, and employers are required to send lists of outworkers twice a year to the sanitary authority of the district in which such workers reside. The sanitation of bakehouses has to be supervised in the interests of the public who eat the bread. Laundries may be sources of diffusion of infection, and fall within the Medical Officer's scope. He has also to keep a close eye on the production of milk and cream to avoid adulteration by preservatives or tuberculosis, and also to control milk borne epidemics or infections. The ice cream industry has been known to spread typhoid fever; while accidental contamina-

tion of food has led to outbreaks of poisoning, as in the case of arsenical beer. The manufacture of shaving brushes with infected horsehair may originate anthrax, and call for control with the destruction of infected brushes. A further duty, which is becoming of increasing importance for Port Medical Officers, is supervision of the lot of seamen on board ship, with regard to their sleeping accommodation and the conditions of ventilation in the engine room and stokehole. In fact, the work of the Medical Officer is constantly coming in touch with industry.—E. L. C.

HEALTH OF WORKERS IN THE ENGINEERING INDUSTRY. *A. Massey. Jour. State Med., Oct., 1931, vol. 39, pp. 569–576.*

Carlyle's dictum about man, in a great engineering town, is of import: "Nowhere do you find him without tools; without tools he is nothing; with tools he is all." The viewpoint upon industry of the author of the article is that the engineering worker exerts an important influence in his city upon public health. The more prosperous and healthy is the industry, the better is the health of the city. Engineering calls for skill, and for young men to exercise it; as age advances, a selective influence is exerted which transfers the workers to less exacting vocations. Hence the age distribution of the industry is unfavorable, even though the health conditions may be excellent. Factory environment should exert a favorable influence, particularly through scientifically ordered ventilation, based on adequate cooling powers of the air.

Engineering presents certain hazards, among which exposure to dust is important, particularly in sandblasting, which should now be done with shot rather than with sand; even so, the shot impinging on the castings, by removing fine particles of sand, generates dangerous dust, which calls for control by the use of exhaust ventilation. A new hazard is that arising from chromium plating, during which vapor containing chromic acid rises from the plating tank; this vapor may set up dermatitis and chrome holes on the skin and mucous membranes, particularly acting on the nasal septum. A comparatively new process is that of cellulose spraying, in which fumes of volatile amyl compounds and benzene derivatives may escape into the air, and affect the workers injuriously. Oil dermatitis and boils still occur from the use of lubricating and cooling fluids during metal cutting; these troubles have been carefully studied, and may be avoided by using a disinfectant with the oil, and applying an emollient to the skin after careful cleansing. Safety methods are becoming general for the prevention of accidents; special officers are appointed, who are acting in close cooperation with the Public Health Department. Part of their duties is the avoidance of fatigue during working hours, which is today much lessened by the introduction of modern machine tools to carry out unduly heavy work. More regard, however, should be paid to the construction of these tools, and to the avoidance of monotony during their use. The prevention of fatigue, as largely of accidents, depends upon the maintenance of psychologic and pathologic normality.—E. L. C.

A Study of Workers Employed in Cleaning Public Vehicles. *M. Van Themsche. Rev. du travail, 1931, vol. 32, pp. 836–861.*

This long article deals with an examination of 200 men employed in cleaning Belgian railway carriages. The conditions of the work are described, particularly with regard to the use of vacuum exhaust to replace hand dusting; the vacuum may be created by a central engine or by a movable fan. Vacuum cleaning is quicker and better than handwork. There is exposure to dust for which the men use tobacco chewing to meet dryness of the mouth. Examination of the dust showed only ordinary staphylococci and no pathognomonic germs. Detailed clinical examination of all the systems of the body was carried out; but no indications were detected of any occupational lesion. There was no predisposition to tuberculosis. The report is of interest rather for its negative results, than for any positive findings.—E. L. C.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

Investigations among "Pounders Up" in the Boot and Shoe Industry. *M. Grotjahn. Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 1, pp. 687–702, in Bull. Hyg., Oct., 1931, vol. 6, pp. 746–748.*

"Pounding up" consists in smoothing the creases as the shoe leather is drawn over and fixed to the insole. This work is now done by machinery almost universally. The machine usually consists of a horizontal metal rod on which metal rings are closely set. The work is noisy and demands a considerable amount of physical energy. The drum rotates at a high speed so that the blows, which the numerous rings affixed to the drum perform to the minute, number tens of thousands. This enormous vibration acts on the fingers, hands, and arms of the workers who hold the shoe. Up to a certain point the worker is able, by the way in which he holds the shoe toward the machine, to lessen the effect of the blows, but the stance of the workman before the machine varies according to the nature of the shoe; for instance, men's and outdoor boots require a quite different position from that required for women's and children's shoes.

Pounding up is piecework and the average production in an eight-hour day is between 600 and 900 pairs. The first reference to injury from this work dates from 1926 when Gerbis, a factory inspector, spoke of the angioneurotic nature of the symptoms. Subsequent reports are mentioned.

In the year 1930, through the German Association for Factory Hygiene, the question of prevention of the effects among pounders up was investigated. A questionnaire was prepared and 438 replies were received from pounders up; in the whole of Germany there are probably 600 to 800. The extent of the symptoms of tingling and Raynaud's phenomena were well brought out. Subjectively the effects prevented bicycling in winter, the avoidance of bathing in summer because the forearms "died"; one workman

had to give up military service because the gun fell from his hand. In advanced cases the sufferers had to change their work as they were unable to press the shoe with the necessary force against the drum. In less advanced cases warming the "dead" fingers before beginning work sufficed, but this initial warming gave them the feeling that they were being pricked with thousands of needles. In some cases sleep was interfered with and the painful sensations were more marked at night, reaching to the shoulder.

For statistical purposes the workers were divided into (1) those unaffected; (2) those slightly affected; and (3) those severely affected. Tables show the results.

The relation between the injury and the age is important; for full time pounders up the unaffected diminish rapidly with the number of years of employment. Further, it is shown that the workman becomes injured more quickly and more severely the younger he was at the time of commencing pounding up work. Apparently the best time for taking up the work is about the twenty-fifth year.

In regard to preventive measures the paper states:

1. The importance of the age of commencing work should be taken into consideration.

2. Alternation of employment is suggested on the ground that eight hours a day is too big a strain on the nerves of the blood vessels of the hand. If half a day could be alternated with some other work, there would be a great gain.

3. Technical improvements are needed; here they speak hopefully of improvements taking place in the machinery which will enable a machine to do the work now done by hand. One such machine, they say, is already on the market.

—T. M. L.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

THE REACTION OF EXPERIMENTAL ANIMALS AND OF MAN TO POISONOUS GASES. *A. Evers. Arch. f. Hyg., Aug., 1931, vol. 106, pp. 255–270.*

The results of experiments with poisonous gases in small experimental animals are referable, in part, to large animals and to man. For acute fatal poisoning, the amounts necessary are the same as for rabbits and for guinea-pigs. For subacute and chronic fatal poisoning and also to cause illness, the dose must be greater than that required in the experiments on small animals. The species of animal, however, plays a considerable rôle in the reaction during exposure to the poisonous atmosphere.

COLORIMETRIC ANALYSIS. DETERMINATION OF BISMUTH, ALUMINIUM, AND ZINC. I. *M. Teitelbaum. Abstr. from Ztschr. f. anal. Chem., 1930, vol. 82, pp. 366–374, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., July 15, 1931, vol. 60, pp. 359–360.*

The metals are precipitated as their compounds with pyrogallol and oxyquinoline, respectively, and the phenols determined colorimetrically by their reduction of phosphomolybdic acid (Folin-Denis). Bismuth as the pyrogallol compound is precipitated as $BiO_3C_6H_3$, treated with Folin's reagent, and read colorimetrically. Bismuth, aluminium, and zinc in solution are precipitated by the addition of

oxyquinoline acetate solution and similarly determined colorimetrically. The sensitivity of the tests is as follows: for bismuth 0.006 mg. per cubic centimeter; for aluminium 0.002 mg. per cubic centimeter; and for zinc 0.008 mg. per cubic centimeter.—L. T. F.

THE ABSORPTION OF ALUMINUM COMPOUNDS. *D. Tourtellotte and O. S. Rask. Am. Jour. Hyg., July, 1931, vol. 14, pp. 225–230.*

A group of rats raised from weaning to maturity on a diet containing 0.6 per cent. of aluminium chloride, $AlCl_3 . 6H_2O$ (corresponding to 600 parts per million of aluminium in the food) were normal and healthy animals throughout the experiment. Analyses of the tissues by the spectrographic method showed no absorption or deposition of the aluminium to have occurred. "Accordingly, diets containing 600 parts per million of aluminium are not in any way injurious to growth and health as suggested by Schaeffer et al."

WARNING AGENTS FOR FUEL GASES. *A. C. Fieldner, R. R. Sayers, W. P. Yant, S. H. Katz, J. B. Shohan, and R. D. Leitch. U. S. Bur. Mines, Monograph 4, 1931, pp. 177.*

"The gas industry has always been aware of the value of the odor of such gases as coal gas and carbureted water gas for giving warning of their presence to consumers and employees. Developments in the industry, however, are tending toward increased use of less odorous types of gases, such as natural gas, air carbureted with propane or butane, and blends of odorous types of manufactured gas with natural gas. The American Gas Association, recognizing these trends in the industry, requested the United States Bureau of Mines to make a comprehensive search for suitable substances that might be added to fuel gases which lack the sense-affecting properties necessary for detecting significant escape of gas. It was also desired that, if possible, agents should be found which, due to their odor or irritating effect, would arouse sleeping persons before the escaping gas attained dangerous concentrations.

"In view of the great importance of this problem from considerations of public safety and conservation of fuel and in view of the previous experience of the Bureau's staff with physiological research on industrial gases, as well as its familiarity with the technique of gas production and distribution, the United States Bureau of Mines undertook the problem. This report to the American Gas Association presents and discusses the objectives, procedures, and results of the cooperative investigation."

The investigation was conducted by mutual agreement between the United States Bureau of Mines and the American Gas Association. The terms of this agreement are given in detail.

The objectives of the investigation were as follows:

1. To make a survey of possible substances, which due to their odor, irritant properties, or other action on the human senses, may serve as warning agents of the presence of gas to persons exposed.

2. To ascertain those chemical, physical, and physiologic properties which have a bearing on the use of these substances for this purpose.

3. To determine the concentrations in gas required to produce noticeable effects on the senses, and to measure and describe these effects in so far as possible. It is desired, if at all possible, to discover an

agent which will act as a warning to sleeping persons, as well as to those who are awake.

4. To ascertain the corrosive and other effects on the iron, steel, brass, bronze, tin, oil impregnated leather and other materials used in the construction of holders, governors, exhausters, mains, valves, drips, service pipes, meters, and appliances; and to determine the effect, if any, of these materials and such equipment on the substances considered for use as warning agents.

5. To ascertain the special effects, if any, from combustion products caused by the introduction of such warning agents, on persons, appliances, cooking utensils, and household furnishings.

6. To determine the stability and carrying properties of otherwise suitable substances in the presence of manufactured gas, including the absorbent and removing action of drips, condensates, and other liquids or films, present in plant and distribution equipment.

7. To determine the cost and availability and toxic properties of any substances which appear suitable in other respects.

At the outset of the study it was obvious that it would be necessary to select from the large number of chemical compounds that possess some degree of warning properties a group representing those having the greatest apparent possibilities, and then to amplify the study of the selected group. The plan inaugurated was to:

1. Search the literature and other sources of information for compounds which on the basis of their known or probable properties would have possible use as warning agents and to select from these a rather large group of the most promising substances.

2. Purchase or synthesize specimens of the selected group and observe them qualitatively for warning properties, chemical stability, and other properties making them desirable or undesirable for their intended use.

3. Make quantitative odor intensity measurements of the promising materials and observe their psychologic and physiologic effects.

4. Choose a small group of the most satisfactory materials representative of types of warning agents, as odors and irritants for:

a. Laboratory corrosion tests.

b. Effects on sleeping persons.

c. Field tests to determine carrying power and stability, and the practical aspects of using warning agents in the fuel gas industry.

5. Select the most satisfactory substances for industrial use.

Ninety-three compounds representing thirty-six different types were selected and listed by chemical name, with their formulas, a brief remark as to their pertinent physical and physiologic properties with indications as to how they were tested (*i.e.*, by Katz and Allison's odorimeter, by sleep test, field tests, or dismissed as not promising). The odor scale and the scale of nasal, throat, and eye irritation are given in Table 1.

It is shown that sensory effects plotted against actual concentrations on semilogarithmic paper give a line which, for practical purposes (and probably for theoretical), is straight.

Then follow in meticulous but concise detail the laboratory tests (practically all on humans) of the substances selected as the most promising. They were: crotonaldehyde, a nose and throat irritant; chloracetophenone, a lacrimator; ethyl mercaptan, a disagreeable odor; pyridine, a tolerable odor; amyl acetate, a mild, pleasant odor; and butylene, amylene, and cracked-oil condensate (Pintsch-gas process), as typical of the so-called "gassy" odors. The authors were able to determine the minimum concentrations of the promising substances which

were effective in waking sleeping persons.

"The most promising substances were studied in field tests. In these studies attention was given to transmission of the warning agents, warning properties of the impregnated gas, reaction of consumers, and their complaints regarding leaks. The materials used were crotonaldehyde, chloracetophenone (small-scale tests only), ethyl mercaptan, pyridine, amyl acetate, butylene, amylene, and cracked-oil condensate (Pintsch-gas process).

TABLE 1.—ODOR SCALE AND SCALE OF NASAL, THROAT, AND EYE IRRITATION

NUMERICAL DEGREE	INTENSITY	DESCRIPTION
	Odor Scale	
0	No odor	No detectable odor.
1	Very faint	Minimum but positively perceptible odor.
2	Faint	Weak odor, readily perceptible.
3	Easily noticeable	Moderate intensity.
4	Strong	Cogent, forcible odor.
5	Very strong	Intense effect, may bite or irritate.
	Irritant Scale	
0	No irritation	No detectable irritation.
1	Faint	Just perceptible, threshold, not painful.
2	Moderate	Moderate degree irritation, midway between 1 and 3.
3	Strong	Discomforting, painful, but may be endured.
4	Intolerable	Exceedingly painful, intolerable.

"Crotonaldehyde was found to be the most promising warning agent of the nose and throat irritant type. It awakened sleeping persons in laboratory tests. It gave warning of leaks in field tests, and these tests indicated that it would be transmitted through the lines satisfactorily after they had become saturated."

"In the only field tests affording direct comparison, ethyl mercaptan was the most effective compound for causing complaints of leaks. Crotonaldehyde was second in this respect. No complaint of leaks was made as the results of using the other substances. However, pyridine, butylene, amylene, and cracked-oil condensate were used in the same distribution system following crotonaldehyde and ethyl mercaptan, and probably all prominent leaks had been revealed and repaired."

"For equal intensities, unpleasant odors were found to be far more effective in field tests than pleasant odors.

"In laboratory tests, odors were not found to awaken sleeping persons unless present in high, impractical, and sometimes nauseating amounts.

"Nose and throat irritants, including sternutators or 'sneeze gases,' were found in laboratory tests to be very effective in waking sleeping persons.

"Consumers of gas impregnated with warning agents did not experience difficulty or discomfort unless leaks were present. When a particular leak was repaired the complaint ceased."

"It must be realized that this investigation can do no more than indicate certain warning agents for fuel gases that may prove feasible in

practice. While the list of substances subjected to laboratory investigation is believed to be comprehensive, the field tests thus far conducted were necessarily too limited in both time and scope for final conclusions.

"Actual full-scale use over extended periods under the various conditions that prevail in the distribution and utilization of relatively odorless gases will be necessary before final judgment can be reached as to the practical value and commercial feasibility of adding warning agents to fuel gases."

This monograph, encyclopedic in character, is well indexed and unusually well written. It will serve as a useful guide to the Gas Industry and incidentally gives to industrial hygiene many data of both practical and pharmacologic importance.

Work of this type can and should be undertaken only by co-operative agreements between the industry concerned and the investigators selected. The American Gas Association is to be congratulated on persuading the Bureau of Mines to do this work for which probably no other laboratories in the world were suitably equipped in either laboratory facilities or personnel.—P. D.

A Compact Apparatus for the Determination of Carbon Monoxide by the Iodine Pentoxide Method. *M. J. Martinek. Abstr. as follows from Am. Jour. Pub. Health, Sept., 1931, vol. 21, pp. 1036–1037, in Chem. Abstr., Oct. 20, 1931, vol. 25, p. 5315.*

This is a more compact, portable outfit for use in the field. Complete details of construction are given. There is little if any change in the technic.

On the Influence of Hydrogen on the Accuracy of the Determination of Carbon Monoxide with the Dräger Apparatus. *J. G. de Voogd and A. van der Linden. Abstr. as follows from Chem. Weekbl., 1931, pp. 133–134, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Sept. 23, 1931, vol. 61, p. 403.*

Neither hydrogen nor the hydrocarbons present affected the determination of carbon monoxide in a mixture containing 90 volumes per cent. air and 1 volume per cent. illuminating gas, by means of the Dräger apparatus. The indicated carbon monoxide content corresponded to the theoretical up to 0.004 volumes per cent. of the weight. An approximately 3 per cent. hydrogen-air mixture showed, to be sure, a temperature rise indicative of oxidation, but only such a rise as corresponded to the oxidation of 0.73 per cent. of the total hydrogen content.—A. M.

Determination of Carbon Monoxide. *H. A. J. Pieters. Abstr. as follows from Ztschr. f. anal. Chem., 1931, vol. 85, pp. 50–60, in Chem. Abstr., Oct. 20, 1931, vol. 25, p. 5366.*

The best methods for determining carbon monoxide in gas mixtures were studied, and a full account is given of the necessary apparatus and procedures. If the dried gas is brought in contact with iodine pentoxide at 195°, the carbon monoxide is oxidized to carbon dioxide and the iodine pentoxide is reduced to iodine which can be absorbed and titrated with sodium thiosulphate. Good results can be obtained only when no hydrogen is present, which also reduces iodine pentoxide under these conditions. If carbon mon-

oxide is brought in contact with iodine pentoxide in fuming sulphuric acid, the carbon monoxide is completely absorbed. When only carbon monoxide and air are present, the presence of 25 per cent. sulphur trioxide in the sulphuric acid is desirable, but if hydrogen and methane are present, only 10 per cent. dissolved sulphur trioxide is permissible. If carbon monoxide and hydrogen are brought into contact with a nickel catalyzer at 250°, all the carbon monoxide is changed to methane, and the carbon monoxide can be calculated by the diminution in volume. This method is good for *determining carbon monoxide in illuminating gas.* Another excellent method for determining carbon monoxide consists in determining the quantity of gas necessary to give to blood the absorption spectrum which is characteristic of carbon monoxide.—P. D.

DETERMINATION OF CARBON MONOXIDE IN MIXTURES WITH AIR. *H. A. J. Pieters. Abstr. as follows from Ztschr. f. anal. Chem., 1931, vol. 85, pp. 113–117, in Chem. Abstr., Oct. 20, 1931, vol. 25, p. 5366.*

Silver oxide catalyzes the oxidation of carbon monoxide to carbon dioxide by air at room temperature. The catalyst retains a little of the carbon dioxide formed, but accurate results can be obtained in determining the carbon dioxide formed if the silver oxide is saturated with carbon dioxide at the start. Quartz or asbestos covered with a thin coating of cupric oxide will accomplish the same thing at 150°. Properly prepared manganese dioxide is effective at room temperature. The carbon dioxide formed can be absorbed and the diminution in volume used as a measure; it can be converted into an insoluble carbonate and weighed; it can be determined by titration, also by the interferometer; or the carbon monoxide can be determined by measuring the heat evolved as a result of the oxidation to carbon dioxide.—P. D.

THE FORMATION OF COMPOUNDS BETWEEN LEAD AND LIPOIDS IN THE ORGANISM—THE FATTY ACIDS OF THE LIVER IN LEAD POISONING. II. *G. Orestano. Abstr. as follows from Arch. internat. pharmacodynamie, 1930, vol. 39, pp. 285–293, in Chem. Abstr., Sept. 20, 1931, vol. 25, p. 4936.*

Previous investigations were continued along similar lines except that the animals were poisoned more slowly. Lead compounds were administered by the gastric route for long periods of time; only traces of lead were found in the liver and brain. When colloidal lead sulphide was injected intravenously, the lead was fixed by the liver immediately and marked quantities were detected in the liver even after the injections had been discontinued for some time; only traces of lead were found in the brain. If, however, a more soluble salt such as lead nitrate was injected intravenously, more lead was recovered from the brain than from the liver. Lead was never detected even in traces in the liver and brain lipoids.

CHRONIC LEAD POISONING. *S. F. McDonald. Med. Jour. Australia, May 9, 1931, vol. 1, pp. 572–575.*

The author discusses the diagnosis of lead poisoning in children, the simple paralytic form of plumbism, the encephalopathic form together with

differential diagnosis, and finally various minor forms of poisoning. With respect to adults, the diagnosis of mild and severe forms of plumbism and late manifestations are discussed in detail. A short bibliography is included.—L. T. F.

THE PREVENTION AND CONTROL OF LEAD POISONING IN INDUSTRY. *J. S. Mark. New Jersey Med. Soc. Jour., Oct., 1931, vol. 28, p. 773.*

A CASE OF MERCURIAL POISONING. *A. Langelez. Rev. du travail, 1931, vol. 32, pp. 1253–1259.*

Following the occurrence of a slight case of mercury poisoning, an investigation was carried out at a factory where hair is treated with nitrate of mercury for use in the manufacture of hats. The man concerned was employed in moving bags of treated hair while packing them for dispatch. He was not employed in treating the hair; this process was carried out in an entirely separate place. Chemical analysis of the atmosphere in which he was working indicated the presence of traces of mercury. Further tests were then carried out by placing sacks of treated hair in a closed chamber in which test papers were exposed. When the hair had been prepared during the preceding four weeks, the test papers became gray after four hours, and were black after twenty-four hours. When the hair had been prepared for a year, no reaction could be detected for seven hours, and after twenty-four the black tint was not so deep. When the hair had been prepared two years, the black tint was still less intense after twenty-four hours. This investigation indicates that an uncombined salt of mercury is present on hair treated with nitrate of mercury, and that vapors containing mercury may arise at ordinary temperatures. In the present instance, such vapors traversed strong paper bags.—E. L. C.

DETERMINATION OF SMALL AMOUNTS OF ZINC IN THE PRESENCE OF LEAD. *M. E. Stas. Abstr. as follows from Pharm. Weekbl., 1930, pp. 93–97, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., July 1, 1931, vol. 60, p. 178.*

In the absence of the sulphide or ferrocyanide nephelometric methods of zinc determination (which require the removal of lead in any case in order to give correct results), the *o*-oxyquinoline method gives good results even in the presence of lead.—L. T. F.

DUST HAZARDS AND THEIR EFFECTS

ON THE QUESTION OF OBTAINING A CONSTANT DUST CONCENTRATION IN A DUST CABINET. *H. Abeshaus. Arch. f. Hyg., April–May, 1931, vol. 106, pp. 102–111. Translation of Author's Summary, p. 110.*

1. By means of a suitable simple apparatus, it was possible through the method of dispersing eddies to obtain a constant dust concentration some time after starting the fan, with variations 3 to 8 per cent. in extent.

2. An ordinary fan used for stirring up the dust, whether above or below, did not give a uniform dust concentration in the chamber.

3. Only the combination of two fans, turning in opposite directions

with suitable selected rotative speeds, gave a uniform dust concentration in a particular zone with a fluctuation of 4 per cent.

4. The dust concentration in the central zone was greater than the concentrations at exterior points; such nonuniform vertical distribution was an advantageous condition in those cases where we wished to have different constant dust concentrations.—T. H.

PNEUMONOKONIOSIS IN ITS CLINICAL ASPECTS AND ITS SIGNIFICANCE AS AN INDUSTRIAL DISEASE. *W. Brednow. Abstr. from Klin. Wchnschr., July 19, 1930, vol. 9, p. 1363, in Am. Rev. Tuberc., Nov., 1931, vol. 24, p. 112.*

This is a review and discussion provoked by the recent German ordinance which offers compensation for *severe* cases of pneumonokoniosis. Interested readers are referred to the abstract in the *American Review of Tuberculosis*.—E. O.

ASBESTOS DUST AND ASBESTOSIS BODIES FROM THE LUNGS OF AN ASBESTOS WORKER. *W. E. Cooke. Jour. State Med., Sept., 1931, vol. 39, pp. 544–548.*

Asbestosis bodies are composed of a colloidal covering upon a slender filament of asbestos fiber, upon which the covering is adsorbed. The nuclei of the bodies consist of spicules of biotite. The author ascribes to the iron present in asbestos the reaction which occurs, and maintains that some soluble fraction of asbestos leads to the formation of the asbestosis bodies, and that this chemical action plays its part in the production of pulmonary fibrosis.—E. L. C.

CASE OF ASBESTOS-LIKE BODIES IN THE LUNGS OF A COAL-MINER WHO HAD NEVER WORKED IN ASBESTOS. *F. E. Tylecote and J. S. Dunn. Lancet, Sept. 19, 1931, vol. 2, pp. 632–633.*

Details are given of the pathologic condition found in a fatal case of chronic fibroid tuberculosis of the lungs in a man who had worked as a coal miner. He had never been exposed to asbestos dust; nevertheless, bodies were found in the lungs resembling those which originate from inhaling asbestos dust. They simulated them in size and in general shape, and had rounded swellings at their ends; the color was similar; and they contained free iron abundantly. But they were coarser and less regular than asbestos bodies, and possessed a black core of opaque material. The authors suggest that these bodies resulted from minute fragments of some iron containing mineral, which were inhaled into the lungs, and underwent chemical change under the influence of the tissue fluids; hence resulted the formation of a peripheral lamination from the iron containing part. The interest of these bodies is their occurrence apart from exposure to asbestos.—E. L. C.

PULMONARY ASBESTOSIS COMPLICATED BY PULMONARY TUBERCULOSIS. *W. B. Wood and S. R. Gloyne. Lancet, Oct. 31, 1931, vol. 2, pp. 954–956.*

The point under discussion is whether asbestosis predisposes to pulmonary tuberculosis in the same way that does silicosis. Information is given concerning a total of fifty-seven cases of asbestosis, twelve of which showed evidence of tuberculosis. The information gathered is not held to

be conclusive as to whether either condition prepares the way for the other; nor does it negative either suggestion. But it does definitely indicate that both diseases can be present simultaneously. The article is of value in presenting concisely the symptoms and physical signs of uncomplicated asbestosis, as follows: "Irritable cough, scanty expectoration, shortness of breath, progressing to a distressing dyspnoea on the slightest exertion, pains in the chest and decline in weight, often followed by extreme emaciation. The complexion is 'earthy.' Cyanosis is usually but not invariably present. Clubbing, if present, is of slight degree. On auscultation, fine dry crackles are usually heard over the lung bases posteriorly, and in the axillary regions. Fine pleural friction is often heard. Percussion may reveal some impairment of resonance at the lung bases. Negative points are the absence of haemoptysis—except perhaps an occasional trace of colour in the sputum—and the slight degree of expectoration. Sputum examination reveals the characteristic asbestosis bodies. X-ray examination shows a diffuse fine fibrosis affecting chiefly the lung bases while sparing the lung apices and infraclavicular regions." These characteristics sharply differentiate the condition from those commonly associated with tuberculosis.—E. L. C.

DANGER TO HEALTH FROM GRINDSTONE DUST WITH SPECIAL REFERENCE TO ARTIFICIAL STONES AND SILICOSIS. *Menslage. Abstr. as follows from Zentralbl. f. Gewerbehyg., May, 1931, N. S. vol. 8, pp. 123–125, in Bull. Hyg., Oct., 1931, vol. 6, p. 745.*

The value of this article, written by an engineer, lies in the analysis he gives of artificial grindstones. Such chemical analyses are difficult and expensive. The three he cites were made by a German-American firm.

No. 1. Binding material: ceramic. Grinding material: artificial carborundum.

Analysis of the fired wheel:

	%
Al_2O_3	83.29
SiO_2	11.14
Fe_2O_3	0.83
MgO	0.48
CaO	0.62
Na_2O	0.25
K_2O	0.70
TiO_2	2.69
Total	100.00

Laboratory remarks: Free silica can be practically excluded in a normal, *i.e.*, highly fired stone.

No. 2. Binding material: ceramic. Grinding material: silicon carbide.

Analysis of the fired wheel:

	%
SiC	81.50
SiO_2	12.67
Si	0.85
Al_2O_3	2.89
Fe_2O_3	0.54
MgO	0.18
CaO	0.27
Na_2O	0.29
K_2O	0.83
TiO_2	0.07
Total	100.09

Laboratory remarks: The binding material contains feldspar and quartz; some part of the total silica contained in the feldspar is free silica. The heat reactions during firing dissolve some, but not all, of the free silica so that in the finished stone the free silica amounts to about 3.55 per cent.

A third analysis (in essentials not differing widely from those detailed)

is given in which the binding material was a silicate and the grinding material artificial carborundum. The laboratory remark shows it to contain practically no free silica.

The author states that in grinding with artificial stone the "wear" proportion of the article ground to the stone is as 1:45 (in parts by weight) as compared with the much greater 1:5 to 1:10 with natural stone.

His view is that from purely physical considerations any dust in inordinate amount is harmful, but that silicosis, generally speaking, can only arise from natural sandstones.—T. M. L.

Some Geographical and Anthropological Factors in the Study of Industrial Diseases. *E. G. Bowen. Abstr. as follows from Jour. State Med., Nov., 1930, vol. 38, pp. 666–671, in Med. Jour. Australia, Sept. 12, 1931, vol. 2, p. 337.*

Bowen has attempted to show how geographic and racial factors affect the course of miners' phthisis. An anthropologic survey of two adjacent valley regions in Cardiganshire has revealed the existence of two separate types of inhabitant, one type inhabiting each of the areas surveyed. The two valleys present different geographic features, one, inhabited by dark, long-headed folk of slender build, being narrow and gorge-like; the other valley is wider and peopled by a larger, fair-haired type of individual. Lead and zinc mining has been carried out in these valleys for many centuries and has now declined, leaving the inhabitants to take up farming. Sheep farming is practicable only in the narrow valley, but crops are grown in the more fertile one. Examination of the death registers in the area from 1879 to 1926 shows the incidence of miners' phthisis to be high. The mines were badly ventilated and very wet, and complication of silicosis by tuberculosis was almost universal. It was found that in the narrow region 37 per cent. of the deaths took place between the ages of 57 and 62, and only 8 per cent. between the ages of 65 and 70, as against 22 per cent. and 20 per cent., respectively, in the wider, more fertile area. Most deaths from miners' phthisis took place when the mining activities were declining. The incidence of simple pulmonary tuberculosis follows the same variations in the period under review as miners' phthisis. The better class of living, more sunshine, and other social and economic factors in the second valley have resulted in increased resistance to pulmonary tuberculosis in the older mining population as well as in the present agricultural population.

Silicosis. *Internat. Labour Office, Studies and Rep., Series F (Indust. Hyg.) No. 13, 1930, pp. 24.*

This issue consists of the resolutions adopted by the conference held at Johannesburg in August, 1930; although only just published, it is a supplement to the larger volume which recorded the proceedings of the conference and should be filed with it (see This Jour., 1931, vol. 13, p. 183). It is a useful summary for reference purposes. The part dealing with the medical aspects, including etiology, pathology, and diagnosis, is particularly concise and accurate. There are three appendixes, one of which is concerned with radiology and sets a standard of technic; a second deals

with preventive measures as practised in mining; the third discusses prognosis, after care, and compensation.—E. L. C.

SILICA IN THE BRONCHIAL GLANDS IN PULMONARY SILICOSIS. *A. Leulier and A. Policard. Abstr. as follows from Compt. rend. Soc. de biol., 1931, vol. 106, pp. 1034–1036, in Physiol. Abstr., Sept.-Oct., 1931, vol. 16, p. 391.*

The portion of the ash of the bronchial glands which is insoluble in hydrochloric acid is taken as a crude measure of the amount of silica contained in them. Scarcely a trace of silica is indicated by this method as existing in the glands. Evidently there is a difference in mobility between the elements in the lung which fix the silica and those fixing carbon in anthracosis. The latter migrate freely to the glands.

SILICOSIS AND TUBERCULOSIS. *W. Mascher. Abstr. as follows from Beitr. z. Klin. d. Tuberk., 1930, vol. 73, p. 388, in Am. Rev. Tuberc., Nov., 1931, vol. 24, pp. 114–115.*

The author examined thirty-two workers in the quartz industry, the workers being subjected to an intense concentration of dust containing 99 per cent. of silicic acid. Roentgenologically eleven of the workers revealed silicosis in stage 1, three in stage 2, and seven in stage 3, while six were free from silicosis and five were questionable. The latent period of the disease averaged about one year, and a definite disposition was discernible. Workers with deformities of the thorax or the spinal column showed a severe silicosis after a relatively short time. In none of the cases were tubercle bacilli found in the sputum, but one of them was a case of spontaneous pneumothorax and two postmortems disclosed silicosis without tuberculosis. The workers were without exception strong, athletic types of men between 20 and 40 years of age. In twelve cases, in which there were found roentgenologically old and fresh tuberculous foci, there could be noted no influence of the silicosis or of the tuberculosis upon each other.

EFFECTS OF COLLOIDAL SILICA UPON THE GROWTH OF TUBERCLE BACILLI IN BLOOD. *S. L. Cummins and C. Weatherall. Brit. Jour. Exper. Path., Aug., 1931, vol. 12, p. 245.*

The authors' experiments *in vitro* lead them to the conclusion that "silica sol does not in any way further the pullulation of tubercle bacilli in human blood outside the body."

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

COMMON COLDS. *W. G. Smillie. Personnel Jour., April, 1931, vol. 9, pp. 470–474.*

We do not know the cause of colds. There is strong evidence that the disease is due to an infectious organism, probably a filterable virus. We believe that this infection is spread by direct contact, from person to person. Some people are entirely immune, but most people contract the infection once or twice a year. We have strong

evidence also that environmental factors, particularly an abrupt drop in atmospheric temperature, play an important part in the production of colds. The acute cold itself is self-limited in duration and seldom causes death. It is often followed by secondary complications, some of them serious. We have no specific method for the treatment or prevention of colds, except avoidance of exposure to infection. Since everyone living an active, busy life is brought into close contact with a large number of other people, it is not possible for one to avoid exposure during the epidemic seasons. The serious complications that sometimes follow an acute cold can be avoided in some instances by rest in bed and avoidance of chilling of the body surface during the acute stages of the disease.—*Author's Summary.*

Vaccine Prophylaxis in Pneumonia. A Review of Fourteen Years' Experience with Inoculation of Native Mine Workers on the Witwatersrand against Pneumonia. *A. J. Orenstein. Abstr. as follows from Jour. Med. Assn. So. Africa, 1931, vol. 5, pp. 339–346, in Bull. Hyg., Oct., 1931, vol. 6, p. 757.*

This paper is a careful study of the results of prophylactic inoculation against pneumonia. Pneumonia has been the chief cause of morbidity and mortality among the native mine workers since the establishment of the gold mining industry on the Witwatersrand. An account is given of the attempts at immunization against pneumonia among the workers. It is maintained that the experiments performed on the natives prior to the introduction of wholesale immunization of all workers have not been conclusive, and only one experiment known as Experiment No. 3 appeared to justify the adoption of prophylactic inoculation. This experiment was started on the Witwatersrand in July, 1914. Of 55,900 natives of various tribes, one half were inoculated and the other half left as controls. Lister's "typed" vaccine was used, containing five specific types with a total content of 2,000 million organisms per dose. One inoculation was given. The inoculated natives gave a case rate of 16.4 per 1,000 and the uninoculated 20.6 per 1,000. As a result inoculation of all natives was made practically compulsory throughout the mines. There was a gradual rise in the pneumonia death rate between 1920 and 1928 indicating that prophylactic vaccination had no high protective value. In 1929 inoculation was discontinued in certain mines and the experience of these was compared with those in which inoculation was continued. Mines in which inoculation was continued had a higher attack rate in 1930 than in 1928, while mines in which inoculation was stopped had both a lower attack rate and a lower death rate as compared with the rates for 1928.

In a paper by Ordman (see This Jour., 1931, vol. 13, p. 172), it was held that the inefficacy of the vaccine used was due to a radical change in the bacterial flora in pneumonia. In this paper the contention that the clinical type of pneumonia has radically changed is examined. The author does not agree with Ordman's findings either with regard to the change in the clinical type of pneumo-

nia or that prophylactic inoculation diminished the attack rate in the early period of the natives' service on the mines.—H. M. W.

PNEUMONIA: PRESENT POSITION ON THE MINES. *A. Frew, J. H. G. Blommestein, and others. Jour. Med. Assn. So. Africa, Aug. 8, 1931, vol. 5, pp. 493–501.*

A free discussion is reported on the use of vaccine as a prophylactic against pneumonia. Since it has been used on newly recruited natives, the facts are that a downward trend held from 1911 to 1920, but since then a steady rise has occurred. Some say that the vaccine has lost its potency; others that a natural ten-year cycle exists; others that diagnosis has altered owing to confusing lobar pneumonia, bronchopneumonia, and infiuenzal pneumonia. The general opinion is that the whole question is sub judice and calls for investigation pursued in particular by collecting and analyzing reliable data. The incidence of the disease appears to vary greatly in the different mines, depending possibly on general welfare conditions and especially on the standard of feeding; such factors mask any effect of vaccine. Meanwhile the medical officers of the mines are declining to continue routine administration of vaccine.—E. L. C.

COAL MINERS AND TUBERCULOSIS. *S. L. Cummins. Jour. State Med., Sept., 1931, vol. 39, pp. 526–536.*

References are given to early investigations regarding the low prevalence of tuberculosis among coal miners, which has been attributed to the inhalation of coal dust. Recent work carried out in South Wales has indicated that the lungs of coal miners are seriously affected by the dust which they inhale in the mines, a proportion of which is composed of silica, either occurring in the coal seams or arising from the intervening rocks. The coal miner suffers more than normal persons do from bronchitis. Why does he not suffer from tuberculosis? The author suggests the possibility that coal dust adsorbs and inactivates tuberculin, so preserving the lungs from tuberculosis. Nevertheless, coal dust tends to accumulate in lungs which have become fibrotic, owing to the presence of silica particles, and by its accumulation, to cause serious interference with the function of respiration, when the breathing efficiency of the lungs becomes seriously compromised.—E. L. C.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

SKIN DISEASES. *Ann. Rep. Chief Inspect. Factories for 1930. H. M. Stationery Office, 1931. (Cmd. 3927.)*

As is usual, much can be learned by the dermatologist, the factory surgeon, or the general practitioner by reading the annual report of Dr. J. C. Bridge, Senior Medical Inspector of Factories. This year only one case of cancer is reported from making arsenical sheep dip. The man, aged 61, had worked in this industry for forty-six years. Ten years previously an epithelioma had been removed from his right shoulder. Five years after this operation a similar growth was

excised from the skin of the neck. His present complaint was the existence of two tumors, one-half inch in size, on the inner aspect of the upper arm, and the second, a little larger, on the skin behind the glans penis. During the course of many years' work this man had absorbed through his mouth and lungs, and his skin had been exposed to, much irritating arsenical dust. The perennial questions arise: To which are we to attribute the predominating rôle in causing cancer, the systemic absorption or the local irritation? Again: Why is cancer from arsenic seen only on the skin? There is the miners' lung cancer prevalent on the continent, among those who raise certain arsenical minerals, but its origin is still sub judice.

The cases of anthrax notified were forty-three in 1930 and forty in 1929. The death rate was approximately the same: six for the first-mentioned and five for the latter. As duplicate treatments were used in some cases, and the stage of the disease is not given when specific medication was begun, the value of particular methods of treatment cannot be compared. In twenty-nine instances serum was used alone and there were four deaths; out of six cases where both serum and an arsenical compound were injected, one died. As delay often occurs in diagnosing the primary papule or pustule, Dr. Bridge has distributed to every worker in these special industries cards to be shown by him to any treatment center he may attend.

Chrome ulcerations are given as ninety-five, against 109 the previous year. Pitch, tar, paraffin, and oils have been responsible for 194 epitheliomatous ulcerations, with thirty-six fatalities. The deaths are fortunately less than in the previous year, which gives a record of fifty deaths out of 165 cases. Bridge gives his usual useful analysis, showing the particular agent, industry, and number affected. These figures would be more valuable if the total number of employees exposed to each individual risk could be obtained.

For the first time in the last four years the notifications of the trade dermatoses have shown a decrease. The figure this year is 789. Whether it represents more intelligence in the use of preventive measures, or is a reflex of lessened employment, and therefore lessened exposure, is a moot point. Two informative tables are presented: The first shows the number of workmen affected by each agent; the second shows how many persons succumb in each industry. As has been usual during the last four years, alkalies head the list with 160; sugar comes next with 71, and, in a decreasing ratio: oil, 69; chrome, 57; turpentine and its substitutes, 49; dyes, 47; chemicals unclassified, 43; friction and heat, 43; petrol and benzene, 39; dough, 35; acids, 28; paraffin, 26; French polish, 25; nickel compounds, 19; and accelerators, 11. An interesting innovation is that the subject of bakers' eczema has been referred to the Medical Research Council. Dr. MacCormac has been deputed to make a preliminary investigation to provide lines of research. To the abstracter it would seem that one essential line of inquiry is the differential diagnosis between this special variety of dermatosis and other sim-

ilarly situated exogenous eruptions, and the dermatoses of internal origin, which resemble them and are located on the same parts. This is largely the crux of the confusion, and often presents great difficulty. Dr. Bridge's list of occupations responsible for the several dermatoses is as follows: dyers and calico printers, 104 affected; engineers, 102; laborers, 74; metal platers and polishers, 66; bakers and confectioners, 58; French polishers, 50; painters, 40; leather workers and tanners, 38; chemical workers, 31; rubber workers, 31; sugar confectioners, 30; metal workers, 28; textile workers, 20; oil refiners, 19; printers, 19; sugar refiners, 13; pottery workers, 13; flour workers, 9; and biscuit makers, 8.—R. P. W.

DERMATITIS FROM ORANGES AND LEMONS. *S. G. Horner. Lancet, Oct. 31, 1931, vol. 2, pp. 961–962.*

Dermatitis occurs seasonally among workers preparing oranges and lemons for marmalade. The condition occurs most among the peelers, who are brought in contact with the skin of the fruit which contains an essential oil known as limonene. Limonene is a terpene—a hydrocarbon group whose irritant action on the skin is exampled in the turpentines. If the exposed skin is oiled before work, injury rarely follows. An experiment is quoted of a marmalade worker who contracted dermatitis at her work, who only reacted to an application of the outer surface of the fruit peel, and not to any other part of the fruit.—E. L. C.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

NINTH ANNUAL REPORT OF THE SAFETY IN MINES RESEARCH BOARD. *H. M. Stationery Office, 1931, pp. 86.*

This publication is devoted chiefly to research relative to safety in mines. It tells of the work which is being carried out at the research station at Buxton, and contains a series of valuable illustrations relative to the causation of explosions in coal mines, and to the way in which a shock wave from an explosive travels. In this field of work, as well as in that of disease, quartz and sandstone are dangerous materials, which can yield sparks that will ignite fire damp.

In addition to these safety matters, progress is reported of the activities of the Health Advisory Committee to the Ministry of Mines, which continues to be engaged upon problems of silicosis and like questions. Slate dust and dust in anthracite mines have been found to impair the health of the workers by setting up pathologic conditions in the lungs. Experimental work on animals exposed to dust inhalation indicated that of all dusts examined, the most deadly was precipitated silica. Less dangerous, but producing fibrosis, were the following, arranged in order of decreasing toxicity: flint, slate, aluminium hydroxide, precipitated chalk, magnesium carbonate, and carborundum. Calc spar and emery were borderline dusts, of which large amounts might cause fibrosis. Hematite, talc, and molecular mixtures of soluble silica, with aluminium hydroxide and magnesium carbonate, respectively, were not found to cause lesions in the lung; shale, washed free from soluble matter, appeared to cause fibrosis more readily

than unwashed shale. No investigation was made into the predisposition of the lesions caused to succumb to tuberculosis. Considerable advance has been made in the use of dust traps to capture dust generated by pneumatic drills. Research into the effect of the environmental conditions of coal mining on general health have yielded results which are largely negative, owing to insuperable difficulties connected with obtaining reliable statistics. Nevertheless, interesting data have been obtained, and the effect of various factors on absenteeism are being carefully analyzed.—E. L. C.

INDUSTRIAL SURGERY

BURNS AND SCALDS. *E. I. Lloyd. Abstr. as follows from Brit. Med. Jour., 1931, vol. 1, p. 177, in Canadian Med. Assn. Jour., Oct., 1931, vol. 25, p. 496.*

A timely review of the present status of the treatment of burns is here presented, which opened a discussion of this subject in the section of surgery at the annual meeting of the British Medical Association. Improved industrial conditions have lessened the number of burns in workmen, the death toll from such accidents being chiefly among children. The mortality in Fraser's Edinburgh Series (1926) in children under 10 years of age was only 38.7 per cent. Prognosis depends not on the depth of the burn but on the surface area involved and the age of the patient. Immediate death is due to shock, and is a physical process; later fatalities are dependent upon toxemia, a chemical mechanism. Treatment must therefore be adapted to the individual case.

Emergency dressings are to be avoided, especially linseed and "carron" oils. Transportation to hospital, with morphia and fluids given for the first two or three hours, is advised. In local treatment, tannic acid, as introduced by Davidson, of Detroit (1925), is still the favored application. The 2.5 per cent. aqueous solution minimizes the absorption of the autolytic products of protein decomposition, lessens pain, prevents subsequent infection, and produces but slight scarring. Anesthesia is desirable, and complete débridement of the damaged tissue. Even in the presence of subsequent infection under the coagulum, moist dressings should not be used, but drainage established, the patient remaining under the electric light cradle. Separation of the coagulum should be followed by flavine in paraffin dressings. Blood transfusion or exsanguination transfusion (Robertson) should be necessary only in well-established toxemia. Deformities and disfigurements following burns are dealt with by plastic surgery.

CLIMATE

OBSERVATIONS UPON THE EFFECTS OF HEAT AND SUNLIGHT IN A TROPICAL CLIMATE. *F. Marsh. Jour. Physiol., 1930, vol. 70, Soc. Proc., pp. xxxviii–xxxix.*

In these interesting experiments, thirty-six healthy albino and black rabbits were exposed, either partly or wholly, to tropical sun in Persia, for the purpose of studying the physiology

of sunstroke and heat stroke. The albino rabbits were capable of withstanding an air temperature of 115°F. in the shade and 148°F. in direct sun, but collapsed at 161°F. The black rabbits failed at 146.5°F. The rectal temperature reached at death was about 112°F.

Both albino and black rabbits withstood temperatures as high as 164.5 to 166°F. in direct sun (shade temperatures 104° to 108° dry bulb, 68° to 70° wet bulb) when their bodies were kept moist by sprinkling with water from a fine nozzle. Similar results were secured when the shaven heads were exposed to the sun while the bodies of the rabbits were shaded and cooled. However, a single rabbit succumbed when his head was shaded and cooled but his body was exposed to the sun.

In four of the collapsed animals blood from the left ventricle showed lactic acid concentrations from 63.4 to 279.9 mg. per 100 c.c.; the carbon dioxide in the plasma was 12 volumes per cent. Observations on a fatal case of heat stroke in a Persian adult twenty-four hours before death showed the following: lactic acid in venous blood, 100 mg.; the urea 84.7 mg.; the dextrose 80 mg.; and the chlorides 436.7 mg. in 100 c.c. No malarial parasites showed, and no leukocytosis. The chloride content of the cerebrospinal fluid was 634.6 mg. in 100 c.c.; the cell content was normal. The volume of urine for twenty-four hours before death was 500 c.c., specific gravity 1.006, urea 2 gm. in 100 c.c., trace of albumin, no sugar, no chlorides. A depression of sweating occurred during the forty-eight hours before death, which is attributed to the low content of chloride in the blood and tissues, in spite of the large amounts of salt and water administered.

The author believes that sunstroke is a cause of hyperthermia and that there is no essential difference between sunstroke and heat stroke.—C. P. Y.

INDUSTRIAL ENVIRONMENTAL CONDITIONS

AN ANALYSIS OF THE LITERATURE CONCERNING THE DEPENDENCY OF VISUAL FUNCTIONS UPON ILLUMINATION INTENSITY. A REPORT PREPARED FOR THE COMMITTEE ON INDUSTRIAL LIGHTING OF THE NATIONAL RESEARCH COUNCIL. *L. T. Troland. Abstr. from Tr. Illumin. Engin. Soc., Feb., 1931, vol. 26, pp. 107–196, in Bull. Hyg., July, 1931, vol. 6, pp. 541–543.*

This analysis forms a monumental contribution to the literature of illumination as it embodies critical studies of 9,000 relevant writings which—prior to 1926—dealt with this important subject. Moreover, the Illuminating Engineering Society proposes to publish decennial extensions bringing up to date this survey prepared for the American National Research Council by Dr. Troland.

Introduced by a discussion of objectives and methods, and rounded off by a summary of conclusions, the abstract of literature is divided into eight sections—each followed by its bibliography: (1) general survey of the problem; (2) absolute sensitivity to light; (3) Fechner's law: discrimination of reflection coefficients of large areas; (4) the dependency of visual acuity upon illumination in-

tensity; (5) speed of vision as determined by intensity; (6) the dependency of color vision upon intensity; (7) oculomotor functions, eyestrain, fatigue, and injury; and (8) the influence of illumination intensity upon practical operations.

VISIBILITY OF OBJECTS AS AFFECTED BY COLOR AND COMPOSITION OF LIGHT. PART I. WITH LIGHTS OF EQUAL LUMINOSITY OR BRIGHTNESS. *C. E. Ferree and G. Rand. Personnel Jour., April, 1931, vol. 9, pp. 475–492.*

IDEM. PART II. WITH LIGHTS EQUALIZED IN BOTH BRIGHTNESS AND SATURATION. *C. E. Ferree and G. Rand. Ibid., Aug., 1931, vol. 10, pp. 108–124.*

"Stimulated by a desire to discover the specifications of the ideal printed page and of other working surfaces requiring high visibility, such as license plates, signals, and reading scales of instruments, the following investigation was made. (1) The physical factors which affect the visibility of objects are analyzed. (2) Possible methods are discussed for determining experimentally the kind and comparative extent of the effect of these factors. (3) The effect of two of the factors, namely, color and composition of light, is studied. This study is made under two conditions: (*a*) with lights of equal luminosity or brightness and (*b*) with lights equalized in both luminosity and saturation of color. In one set of experiments spectrum light was obtained from a large, specially designed, monochromatic illuminator, in order to have a definite and specified composition of light of a high degree of purity. In another set of experiments colored light, complex in composition, was used. It was filtered light obtained from red, yellow, green, and blue dipped bulbs, spectrophotometered for composition. This light also was equalized in luminosity and saturation at the point of work. In a third set of experiments the light used was complex in composition but of daylight quality, being obtained with Macbeth artificial daylight filter. The functions tested include acuity, speed of discrimination, power to sustain acuity, and ocular fatigue. With reference to all of these functions it was found that the eye gives its best performance in the mid-region of the spectrum, but that light of daylight quality is more favorable than any color, even when of spectrum purity, for the discrimination of such details and relations to background as are found in the printed page.

"The eye apparently was not intended to work under what is ordinarily called colored light. Color in light seems to be especially trying to eyes suffering from pathological disturbances and other defects of vision."

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

THE WORK OF AN INDUSTRIAL CLINIC. *N. H. Mummery. Lancet, July 11, 1931, vol. 2, pp. 106–110.*

Some account is given of the rise of industrial welfare and hygiene in England, after which the author tells of a large factory clinic of which he is in charge and which he has himself organized. It serves a personnel of 6,132 operatives and some 30,000

employees serving in restaurants scattered over London. Workers are examined before being engaged, regard being paid to whether they are to be waitresses, telephone operators, motor drivers, bakers, cleaners, or porters. They are reexamined after absence for illness; this provides a close touch with the health of the personnel. Provision is made for dental supervision, and for specialist treatment for eyes and other special senses, and for electrotherapy and massage. Manicure is provided for workers manipulating food products. Acute respiratory diseases account for most cases of sickness; acute gastritis comes next. Fibrositis is an important trouble; it and gastritis have benefited from dental treatment. In 1930, 9,995 patients were seen, of whom 8,455 remained at work; 12,748 redressings were done. There were 12,258 cases of illness, in 9,446 of which the patient remained at work. The members of the staff lost an average of 13 days each in 1929, and 8 days in 1930. The average duration of absence due to illness was 15 days in 1929, and 12.7 days in 1930. As attendances at the clinic have increased, absenteeism has decreased. But there is crying need for control of epidemic nasal catarrh, bronchitis, influenza, and rheumatism.—E. L. C.

Some Observations on Debility. *N. A. Coward. Abstr. as follows from Med. Officer, 1931, vol. 46, pp. 5–7, in Bull. Hyg., Oct., 1931, vol. 6, p. 743.*

After discussing various causes of debility, the author dwells on the importance of systematic and regular examination of the worker, by which he considers much incipient disease could be detected and serious illness averted, and those not suited for factory life could be weeded out. There is a critical period in the lives of the young between their inspection as school children and their entrance into the factories where there is at present no medical supervision. The suggestion is made that young factory adolescents should receive special med ical supervision. There is need of more convalescent homes, and with the diminution in tuberculosis sanatoriums might be converted into convalescent homes and so become preventoriums for that disease. The value of rest is not rightly appreciated in convalescent homes, and many debilitated patients are induced to take long walks when rest is really what they require. It is considered that if persons paid more attention to their weight they would in case of continued loss seek medical advice and thus forestall disease.—A. J. C.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

A Monotonous Job in an Emotional Crisis. *R. B. Hersey. Personnel Jour., Dec., 1930, vol. 9, pp. 290–296.*

"Factors determining the mental attitude of any person toward his life and work are often difficult to trace. This article, nevertheless, attempts to portray, through the intensive study of an individual worker, how the nature of a man's job and his cyclical variations in mood color to a large extent his attitude toward a serious problem of readjustment. The

case portrayed, though not a usual one, brings into high relief the bearing emotional processes and the nature of the job may have in the life of a worker. The study of an extreme case such as this helps in understanding those emotional reactions which less obviously but just as truly characterize the relations of normal men to their work."

THE DISAGREEABLE JOB. SELECTING WORKERS WHO WILL NOT BE ANNOYED. *O. M. Hall. Personnel Jour., Dec., 1930, vol. 9, pp. 297–304.*

"The question of disagreeable jobs is analyzed and discussed. Some concerns have a high and costly labor turnover because of the peculiarly annoying or disagreeable character of the work. It is not greatly annoying to some but others are too disturbed to remain long. This paper describes a technic for detecting before employment those applicants who will not be bothered by the disagreeable features of the work. It selects such a feature and finds by statistical means eight other conditions that are highly correlated with it. That is, those who are not annoyed by the first condition also tend to be unannoyed by the eight others, and conversely, those who are greatly annoyed by the first are greatly annoyed by the others. With this point established, applicants can be examined to find out how much they are annoyed by these other conditions. From this a prediction is made as to how much they will be annoyed by the job. Other things being equal, those found to be unannoyed by the job, so disagreeable to other people, will be selected as the safer risks."

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

A SURVEY OF THE WORK OF EMPLOYEES' MUTUAL BENEFIT ASSOCIATIONS. *D. K. Brundage. U. S. Pub. Health Rep., Sept. 4, 1931, vol. 46, pp. 2102–2119.*

From the replies received, certain general conclusions in regard to sick benefit associations in the United States appear warranted, as follows:

1. As a time-tested organization attempting to meet the needs arising from certain contingencies in the life of the wage earner, the employees' sick-benefit association appears to have found a place for itself in many industrial and mercantile concerns. In recent years a number have gone beyond the original plan in an attempt to explore and develop new fields of service and usefulness to their members. One of these relatively untilled fields consists of organized effort to obtain accurate diagnosis followed by appropriate medical attention and nursing care, including hospitalization if needed, and to secure such in the early stages of disease so that the duration of disability may be shortened as much as possible. Another important field which the more audacious organizations are beginning to till is that of disease prevention, including (*a*) the discovery and correction of physical impairments which, if neglected, may cause disability, and (*b*) health educational activity, especially in the hygiene of living.

2. Only a small fraction of the sick-benefit funds, however, at present are venturing into new fields; as a whole they are still essentially insurance organizations, making no attempt to control either the incidence or the severity of the illnesses afflicting their members. In fulfilling their primary function of providing cash benefits they seldom err on the side of overin-

surance. One-fourth of the funds pay less than $1 per day, and one-half pay from $1 to $2 per day, with $9 to $11 per week the most popular rate of benefits. The criticism most frequently expressed in the questionnaires was the inadequacy of the payment.

3. Virtually no attempt has been made to insure against the uneven costs of treatment of different diseases. A case in which radium treatment is indicated for skin cancer or in which rare skill in surgery is required, ordinarily receives no larger cash benefit than a case of whooping cough causing absence from work for the same length of time. Moreover, insurance against the uneven costs of treating different diseases would dispel the bugaboo of malingering.

4. Virtually as many industrial sick-benefit associations are purely employees' societies as are cooperative organizations of employer and employee. At least 37 per cent of the reporting funds receive no help whatsoever from the company, and an additional 13 per cent receive nominal assistance or contributions only when the fund is in financial difficulties. It seems a reasonable assumption, therefore, that a number of companies might to their profit, i.e., through improved physical conditions of their workers, substitute active company support of the work of the association for a policy of mere passive recognition.

—*Author's Conclusions.*

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

MEDICOLEGAL ASPECTS OF DISABILITY IN INDUSTRIAL LEAD POISONING. *M. Kummel. New Jersey Med. Soc. Jour., April, 1931.*

The author cites twelve cases of physical disability following lead poisoning, and summarizes his findings as follows:

1. A mild case of lead poisoning may leave no permanent disability.

2. The gastro-intestinal type of lead poisoning is of a temporary nature and the resulting persistent constipation is not disabling in character.

3. The cerebrospinal form of lead poisoning is the most distressing in its manifestations, most destructive in nature, most permanent in character, and may result in total permanent disability.

4. The kidneys usually show the most degenerative changes.

5. Long hours and overwork are conducive to greater disability.

6. Chronic lead poisoning sufferers have a lowered resistance, are poor risks for health insurance, and have a shorter life expectancy.

—L. T. F.

REHABILITATION OF DISABLED EMPLOYEES

COMPENSATION BY REHABILITATION. *R. Wreford. Abstr. from Hosp. Social Service, May, 1931, vol. 23, p. 504, in Occup. Therapy, Aug., 1931, vol. 10, p. 270.*

In 1910 Dr. Herman Biggs pointed out the need of an industrial colony for the tuberculous. In such colonies there must be a coordination of medical care, financial interests, and social factors. A lack of a proper balance between these essential elements has caused many failures in the past. The continued and increasing success of the Papworth Village Settlement enables certain inferences to be drawn. It can be shown that given the conditions as laid down by Dr. Biggs, the spread of tuberculous infection can be prevented; that persons suffering from

quiescent, but not necessarily arrested, tuberculosis can be employed without heavy cost; that so far from being useless, consumptive workers can remain productive and almost, if not quite, self-supporting for many years. It has been shown that the correct balance between medicine, economics, and sociology having been found it is possible to apply this same system to others than the tuberculous. Two "pointers" may be given. One is, never let the "charity" element operate in any employment scheme. The other is that the head of the scheme, and all the chiefs of departments should be substandard men or women.

"At present the world is organized for the benefit of the fit and healthy; but the burden of the unfit is growing. Even partially unfit workers are thrown aside if they cannot stand the strain and increasing pace of modern industry. They become, through no fault of their own, subsidized idlers. With the right organization these unfortunate persons could be given new hope and therefore new strength; and their fellow men and women would be freed from the heavy cost of maintaining them.

"To waste the lives of men and women is the cruellest form of extravagance; and that is why it is so essential, on every ground of justice and good citizenship, to provide efficient rehabilitation wherever possible in place of the unscientific system of cash compensation."

REHABILITATING THE TUBERCULOUS —A SUCCESSFUL EXPERIMENT. *E. Hochhauser. Abstr. as follows from Mod. Hosp., April, 1931, vol. 36, p. 52, in Occup. Therapy, Aug., 1931, vol. 10, p. 269.*

This is an excellent discussion of the problem of the convalescent tuberculous patient in rehabilitating himself in industry, especially the garment trade. It gives also a description of the Altro Shops and the results accomplished.

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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GENERAL

HEALTH OF DOCKYARD WORKERS. *H. D. Drennan. Abstr. from Jour. State Med., 1931, vol. 39, pp. 281–287, in Bull. Hyg., Nov., 1931, vol. 6, p. 820.*

The workers in Portsmouth Dockyard enjoy almost complete freedom from industrial disease, thanks to the preventive measures taken. All workers are medically examined on engagement, though in the case of those temporarily employed the examination is not of a very searching nature. In addition lead workers, welders, divers, workers in fresh water tanks, and motor transport drivers are especially examined at short intervals. Hours of work are forty-seven per week with eleven days' holiday with pay during the year. Canvas clothing is supplied to the majority and there is a laundry for the washing and repairing of overalls and towels. There are four restaurants run by a workers' committee, and five dining halls for men who bring their own meals.

For first aid there are dressing boxes, stretchers, wheeled ambulances, a motor ambulance, and a fully equipped surgery with a medical officer on duty night and day. Lead workers are medically examined every fourteen days and those showing signs of plumbism are not reemployed on lead; clean overalls are supplied weekly; no food is taken at work; brushing of teeth twice daily is advised; a daily dose of syrup and infusion of orange with

dilute sulphuric acid is given; workers leave work five minutes early for washing, and respirators are worn when red lead in powdered form is being used. For protection against mechanical injury, moving parts of machines are carefully guarded; fencing is provided where there is risk of falls from heights; slings are periodically tested and workers in molten metal are provided with asbestos spats. To prevent dust hazards, vacuum cleaning of workshops, exhaust fans, respirators, and water sprays are employed. Eyes are protected against flying particles or excessive light. Chrome workers wear rubber gloves and apply an ointment of lanolin and vaseline after washing and an alkaline nasal douche.—C. F. W.

HEALTH EDUCATION IN INDUSTRY. *V. Leverhulme. Jour. State Med., July, 1931, vol. 39, p. 415.*

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

SOME GENERAL CONSIDERATIONS ON OCCUPATIONAL CANCER. *A. Feil. Abstr. as follows from Semaine d. hôp. de Paris, 1931, vol. 7, p. 89, in Am. Jour. Cancer, Oct., 1931, vol. 15, pp. 2882–2883.*

The term occupational cancer the author understands as referring to cancer which appears in relationship to the prolonged and regular exercise of an occupation. Cancer developing upon a traumatic lesion is to be considered an industrial accident rather than an occupational disease. It is customary to consider cancers as having an occupational character when they are produced by arsenic; the by-products of coal, particularly tar, soot, pitch, paraffin, anthracene, etc.; the bituminous schists, mineral oil, petroleum; X-rays and radium; and cobalt (as in the Schneeberg miners). Not all cancers occurring in workers in the above materials are occupational in character, however, for a normal incidence of the disease must be taken into account.

Occupational cancers have certain characteristics which often make possible their differentiation from other types:

1. They practically always belong to the carcinoma group, rarely to endotheliomas or sarcomas.

2. In the majority of cases the lesions are located on the skin of the scrotum, hands, or arms. There are some exceptions, as cancer of the bladder in anilinism and cancer of the lungs in the miners of Schneeberg.

3. They do not appear as primary lesions but are preceded by symptoms of a general intoxication or by local alterations in the skin.

4. They may be precocious, that is, they may occur at an age in which cancer, especially skin cancer, is rare.

5. They are often multiple.

6. They appear in workmen who have worked a long time at the particular occupation. The precancerous period is of long duration.

In addition to these general characteristics, there are others which pertain to the particular form of cancer.

Cancer of chimney sweeps, which is the classical example of occupational cancer, is now rare, since chimney

cleaning is largely carried out by mechanical means. In former times, however, cancer of the scrotum was observed among chimney sweeps far more frequently than the natural incidence would warrant. It was of the squamous cell type and arose on discrete papillomatous lesions of the scrotum. Metastases were rare. Death usually came from progressive cachexia or local invasion. The condition was supposed to be due to local irritation, partly mechanical and partly chemical.

Carcinoma of the lungs among the cobalt miners of Schneeberg is attributed to the inhalation of dust which contains, among other things, an arsenical compound of cobalt. There is disagreement as to whether arsenic or cobalt is the responsible agent. Attention is furthermore called to the intensity of radio-emanations in the Schneeberg mines. The cancer begins insidiously among workmen between 50 and 60 years of age, who have been in the mines from ten to twenty years. The first symptoms are those of a bronchial catarrh, with attacks of productive coughing, the development of painful thoracic areas, and dyspnea. Then appear signs of pulmonary infiltration accompanied by mediastinal involvement. Death follows in six to fifteen months from progressive cachexia. The primary tumor may appear in the bronchi or in the lung tissue; it is most often on the left side.

"Teno-Synovitis Crepitans" of the Wrist among Cane Cutters. *P. S. Malaret. Abstr. as follows from Nineteenth Ann. Rep. Med. Dept. United Fruit Co., 1930, pp. 127–128, in Bull. Hyg., Dec., 1931, vol. 6, p. 869.*

This condition, the result of excessive use of the wrist in new workers or following a long period of rest, is not uncommon among pianists and stenographers, but in sugar cane countries is frequent among laborers at the beginning of the season, especially in those coming new to the work. The right wrist is most often affected from the repeated strokes with the machete (cutting knife), less often the left from the repeated jerking movement of throwing the pieces of cane on to the heap. A synovitis is set up, evidenced at first by pain, crepitation (hence the name), and later by swelling on the dorsum from inflammatory exudate. The tendons first involved are the extensores carpi radialis longior and brevior with their common synovial sheath under the posterior annular ligament, and next the extensor communis digitorum and extensor indicis (also with a common sheath) mainly involved in extension of the fingers. If relief is not sought the three extensor tendons of the thumb are affected, but the extensors of the little finger and the extensor carpi ulnaris seem to escape. For treatment of the most severe cases a splint may be needed, but as a rule rest, a firm bandage, and the local application of an analgesic suffice, free movement being allowed as soon as possible. Most patients are able to return to work in a week, and second attacks are rarely if ever seen. —H. H. S.

Some Factors in the Reduction of Absenteeism Due to Catarrhal Conditions. *T. E. A. Stowell. Brit. Med. Jour., Nov. 28, 1931, vol. 2, pp. 985–986.*

Some notes are published upon the

result of medical supervision in reducing absenteeism at a large industrial undertaking. All new employees are medically examined, and so are all employees away on account of ill health. Ultraviolet medication is used, and also remedial exercises under a gymnasium instructor; inoculations for catarrhal conditions, both prophylactic and curative, were employed. Catarrhal conditions attacked 51.6 per cent. of the employees. Prophylactic inoculation reduced this percentage to 35.3. Severe catarrhal cases, with a temperature over 100° and pulse over 120, were treated with an injection of symmetrical-urea-product 36 given intramuscularly, to which, if the case was of more than thirty-six hours' duration, an antibody called "antibacsyn" was added. While severe cases which refused injection treatments were away from two to six weeks, and often suffered from acute bronchitis or pneumonia, the treated severe cases had an average absenteeism of only four days, which was less than half a day more than mild cases, not severe enough to require injection. —E. L. C.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

ON PROPHYLAXIS OF TUMORS OF THE BLADDER AMONG ANILINE AND TAR WORKERS. *H. Sieben. Abstr. as follows from Med. Klin., 1931, vol. 27, pp. 587–588, in Bull. Hyg., July, 1931, vol. 6, p. 541.*

Two fatal cases of carcinoma of the bladder among tar workers suggested to the author the practicability of removal of the fumes given off in manipulation of aniline and tar. He described conditions in a particular factory for making a composition roofing paper by pouring boiling tar on the material with evolution of clouds of tarry fumes. Not only is the atmosphere rendered thick, but clothes become impregnated.

The author pleads that the rarity of these tumors should not prevent energetic measures for removal of the fumes. He reviews the past literature of the subject, stating his belief that paramidophenol is the exciting cause of aniline cancer. In none of the cases that he has seen has there ever been jaundice and for this reason he rejects the theory that arsine might be the cause.—T. M. L.

GRAVE ANEMIA IN PREGNANT WOMEN FROM BENZENE INTOXICATION. *M. A. Brendeau. Abstr. as follows from Ann. de méd. lég., 1931, vol. 11, p. 95, in Arch. Path., Aug., 1931, vol. 12, p. 310.*

Two women in the fifth month of pregnancy with marked anemia were employed in the same printing establishment and used xylene to clean type. One recovered after hysterectomy and transfusions of blood, and the other died following the same treatment. Chemical analysis of the xylene used revealed metaxylene and other toxic substances.

THE EFFECT OF CARBON MONOXIDE AND OF HYDROGEN SULPHIDE ON NERVE IRRITABILITY. *F. O. Schmitt and L. V. Beck. Biol. Bull., Dec., 1930, vol. 59, pp. 269–274.*

1. Both carbon monoxide and hydrogen sulphide, which presumably inhibit cellular oxidations by combining with the iron containing respiratory enzyme, render nerve nonirritable. The effects of carbon monoxide appear to be completely reversible, those of hydrogen sulphide, less so.

2. Illumination of nerves failing in mixtures of carbon monoxide and oxygen causes a temporary partial return of irritability and there is some evidence that there is an after effect of the illumination which may last some minutes.—*Authors' Summary.*

CARBON MONOXIDE POISONING: CASE. *D. Neighbors and C. C. Garrett. Texas State Jour. Med., Nov., 1931, vol. 27, p. 513.*

DISTRIBUTION OF LEAD IN THE ORGANISM AFTER INTRAVENOUS INJECTIONS. *F. Weyrauch. Abstr. as follows from Ztschr. f. d. ges. exper. Med., 1931, vol. 75, p. 706, in Physiol. Abstr., Dec., 1931, vol. 16, p. 572.*

After the intravenous injection of lead nitrate and colloidal lead sulphide in rabbits, the liver shows the greatest amount of deposited lead granules both microscopically and chemically. The next in order of greatest lead content are spleen, lungs, bones, kidneys, and blood. The brain and the muscles are lead free. There thus is a suggestive parallelism between the uptake of the metal and the reticulo-endothelial system. Microscopic study bears this out.

LEAD CONTENT OF HUMAN BONES. *E. Barth. Virchows Arch. f. path. Anat., June 23, 1931, vol. 281, p. 146.*

LEAD POISONING FROM CHIPPING ON THE U. S. S. "ARIZONA." *I. L. Norman. Abstr. as follows from U. S. Nav. Med. Bull., 1931, vol. 29, pp. 337–350, in Bull. Hyg., Aug., 1931, vol. 6, pp. 605–606.*

This article opens with a summary of knowledge relating to industrial lead poisoning. But it is written to report fifteen cases which originated from chipping painted and red-leaded surfaces on a battleship. The work lasted for five months, and the first case appeared during the last month. Six were of moderate severity, and the remaining nine quite mild. Details are given of the six moderate cases, in which the earliest symptoms were anorexia and weakness, followed by colic. The work, particularly the chipping in double bottoms, was associated with a definite dust hazard. When the cases began to occur, all workers were required to use respirators, consisting of a dust-tight facepiece made of soft rubber, completely covering the mouth and nostrils, with a metal dust filter compartment and outlet valves; compressed cotton was the filtering medium. The commonest blood finding was basophilic stippling, which was present in six cases. Blood pressure was low, but as the lead cachexia disappeared the systolic pressure gradually came back to normal. A loss of weight of from 15 to 20 pounds occurred in the severe cases, which were first put on a high calcium diet until the symptoms disappeared, after which they were de-leaded by producing acidosis with ammonium chloride and phosphoric acid.—E. L. C.

LEAD-POISONING CAUSED BY HANDLING LEAD LINING TEA-CHESTS. *G.*

A. Stephens. Abstr. as follows from Med. Officer, 1931, vol. 46, p. 78, in Bull. Hyg., Nov., 1931, vol. 6, pp. 841–842.

This is an interesting case of lead palsy arising in a man aged 40, who had been employed in a grocery store for twenty-six years, with a brief interval of two and one-half years when he served in the war. He had wrist drop (right) and foot drop (left) and a systolic blood pressure of 200; pyorrhea was very bad and no blue line could be seen. Part of his duties consisted in emptying tea out of lead-lined boxes, collecting the lead, and packing it for carriage by rail; and there was no doubt that the poison had been absorbed from the lead dust on his hands.

Two points of special interest arise: first, that in spite of repeated facilities for absorption nearly twenty-six years elapsed before symptoms appeared; second, that if lead oxide does form in these linings, does it remain exposed for a length of time sufficient to form so much dust that, mixing with the tea, it might give rise to lead poisoning among tea drinkers?—H. H. S.

Ocular Plumbism in Children. *J. L. Gibson. Brit. Jour. Ophth., Nov., 1931, vol. 15, pp. 637–642.*

The cases dealt with in this paper have no pyrexia. The mild ones are brought by their mothers because they have developed a recent internal squint. The squint is due to paralysis of one or of both external recti. Papilledema up to 6 diopters is found, which is due to increase in intracranial tension. The severe cases are more evidently cases of lead encephalopathy. Explanation is given of why soluble lead is available, and why and how it is ingested. Lead is found in the urine. No albumin is found in the urine.

The Treatment of Sycosis, Together with a Comment Concerning Paraffin Cancer. *R. P. White. Abstr. as follows from Dermat. Wchnschr., 1930, vol. 91, p. 1873, in Am. Jour. Cancer, Oct., 1931, vol. 15, p. 2884.*

In the note on paraffin cancer which the author appends to his discussion of sycosis, he states that in England, during the last year the number of persons suffering from skin cancer due to pitch, tar, paraffin, and mineral oil amounted to 165, of whom fifty died. He believes that with proper regulations the number of such cases shows a notable falling off.

The Occurrence of Malignancy in Radio-Active Persons. A General Review of Data Gathered in the Study of the Radium Dial Painters, with Special Reference to the Occurrence of Osteogenic Sarcoma and the Inter-Relationship of Certain Blood Diseases. *H. S. Martland. Am. Jour. Cancer, Oct., 1931, vol. 15, pp. 2435–2516.*

The author's conclusions are as follows:

1. These studies indicate that it is important to have proper medical supervision over the use of radium and x-rays for therapeutic purposes, and governmental control over industries and occupations in which exposure to radio-active substances takes place.

It would seem that the use of radiations for therapeutic purposes should be confined to hospitals and institutions specializing in and competent to handle such treatments, and that the indiscriminate use of radium and x-rays should be in some way con-

trolled. All occupations in which the handling of radio-active substances occurs should be under strict governmental control and supervision. Rules and regulations covering the dangers of exposure should be outlined. Technical methods should be devised in specific industries so that exposure is reduced to a minimum. In the refining of radio-active substances, for instance, Schlundt is of the opinion that this can be accomplished.

If in a certain industry the exposure cannot be reduced to a safety minimum, the procedure in use should be given up for some other method; if this is not possible, the industry should be discontinued. In this respect it is interesting to note that the U. S. Public Health Survey, which shows that the habit of licking brushes in the watch dial industry has been stopped and that various mechanical methods have been devised to apply luminous paint, states that, in spite of the utmost care and precautions against undue exposure, girls who work under the new methods still become radio-active and show an average of one half a microgram of radio-active substance in their bodies. It is a question whether under these conditions we should be satisfied to regard the industry as a safe one.

The above arguments apply also to the sale of radio-active waters, emanators, activators, etc. The sale of all such commodities should be stopped until it is definitely established that they are harmless. The indiscriminate sale of these waters and apparatus by laymen and quacks is criminal. Their therapeutic effects are nil if we exclude the psychic effects produced on the patient. The human race would not suffer by eliminating them.

2. These studies, aside from drawing attention to the occurrence of malignancy in radio-active persons and giving another cause for osteogenic sarcoma, may be of importance in the experimental study of cancer. It may be possible to show new methods by which malignant tumors may be produced in animals. Recently, in Germany, bone sarcoma has been produced in the rabbit by means of irradiation from implanted radium.

3. The question arises, may not other forms of malignancy depend upon the presence in the human body of increased amounts of radio-activity too small, perhaps, to detect by our present methods?

This question will be harder to answer than appears at first thought. While the amounts of radio-active substances in the dial painters are extremely small, being measured only with great difficulty, they must be very much greater than one would ever expect the normal individual to acquire. Unfortunately, at the present time, we are unable to estimate much smaller quantities. A great deal less might produce malignant changes over a longer period of time. Some have thought that 10 micrograms of radium deposited in the tissues of the body is probably just within the limits of tolerance of the average person. From my experience it is impossible to state what is the greatest amount of radio-activity the body can safely carry. My idea is that less than one half of a microgram is dangerous. Theoretically the exposure to, or the use of any radio-active substance that will increase the normal radio-activity of the body is dangerous. At the present time I can only suggest that some other types of malignancy may be caused by minute amounts of radio-active substances to which the human body, in its normal environment, is exposed.

A valuable bibliography is appended.

PAPILLOMATOUS PROLIFERATION ON THE EAR OF A RABBIT PRODUCED BY INTRATRACHEAL INJECTIONS OF TAR IN VASELINE. *C. Oberling and C. Raileanu. Abstr. as follows from Bull. Assn. franç. pour l'étude du cancer, 1931, vol. 20, p. 90, in Am. Jour. Cancer, Oct., 1931, vol. 15, p. 2834.*

In a rabbit that received one intratracheal injection of tar in vaseline there were found, forty-nine days later, papillary outgrowths on the internal aspect of the left ear exactly similar to those which follow the application of tar. Sixty days after the injection, when the animal died of bronchopneumonia, the lesions had

increased somewhat in size, but were otherwise unchanged.

Histologic examination of the tumors showed them to be simple papillomas, with no evidence of epithelial invasion. As they occurred chiefly at the point occupied by the clasp of a metallic identification tag, and on the one ear only, the authors ascribe them to absorption of the tar and its subsequent activity at the point where mechanical irritation favored its fixation. They point out, in conclusion, the infinitesimal amount of tar necessary to initiate proliferation in an animal sensitive to its influence.

THE EFFECT OF TAR INJECTED INTO SUBCUTANEOUS TISSUE. *G. C. Peracchia. Abstr. as follows from Tumori, 1931, vol. 5, p. 1, in Am. Jour. Cancer, Oct., 1931, vol. 15, p. 2835.*

In attempting to produce sarcoma by injecting tar subcutaneously, the author treated 120 rats and fifty mice. From 10 to 30 mg. of a type of tar (exact nature not stated) which had produced skin carcinoma readily in other experiments were injected weekly into the flank. About 60 per cent. of the animals died within the first four months of treatment. Those remaining were followed for from twelve to fifteen months.

In a number of these animals hard subcutaneous nodules developed. The treatment was then suspended for two or three months and the nodules remained stationary or diminished in size. Histologically the nodules showed remains of tar, necrosis, and granulation tissue. Transplants of these nodules were made into twenty-two animals, and in no instance did sarcoma develop.

CHANGES IN THE NERVES OF THE SKIN OF THE MOUSE AFTER PAINTING WITH TAR AND OTHER CHRONIC INJURIES. *H. W. Julius. Abstr. as follows from Virchows Arch. f. path. Anat., 1930, vol. 278, p. 518, in Am. Jour. Cancer, Oct., 1931, vol. 15, pp. 2835–2836.*

The writer studies with the Cajal method the changes in the nerves of the mouse's skin following painting with tar. He does not agree with Itchikawa (*Bull. Assn. franç. pour l'étude du cancer*, 1924, vol. 13, p. 568; 1925, vol. 14, p. 18) and Oertel (*Jour. Path. and Bacteriol.*, 1929, vol. 32, p. 557) that the tumor tissue is provided with nerves and thus that the difference in opinion which has been expressed is due to the unsatisfactory demonstration of finer fibrils given by Bielschowsky impregnation.

Julius shows that in the tissues painted with tar even after simple injury or repeated burning or X-radiation there is a hyperplasia of the finer filaments. These filaments not only appear in the corium, but may also invade the epidermis. He believes that it is merely a higher regenerative process.

The illustrations are excellent and a bibliography of the pertinent literature is appended.

ON THE QUESTION OF INJURY TO HEALTH FROM FLOOR CLEANING MATERIALS. *F. Sartorius and W. Boedicker. Abstr. as follows from Zentralbl. f. Gewerbehyg., April, 1931, N. S. vol. 8, pp. 103–107, in Bull. Hyg., Aug., 1931, vol. 6, p. 605.*

While the introduction of floor cleaning materials since the war has many advantages, as for example, in allaying

dust, germ destruction, saving the floor material, and effective cleaning, a warning has to be uttered against new dangers to health accompanying their use.

Most of them consist of mixtures of ceresin and paraffin with resinous and waxy additions. While in pre-war times turpentine was used, now all manner of inferior turpentine substitutes are used, especially terebene (sangaj oil) and tetralin (tetrahydronaphthalene). These have been known to cause headache and distress in bedrooms recently treated with them. They belong to the high boiling solvents (over 150° C.), and these seem to be the most unpleasant elements.

Latterly, especially for schoolrooms, cleaning materials have been introduced containing fluid constituents in much larger quantities—mostly mixtures of plant and mineral oils. The author had occasion to investigate one of these called "Fallalyt," which had been used in a large town for the cleaning of its schools and had been bought in large amounts.

Fortunately, at an early stage when cleansing was being undertaken during the holidays, the persons engaged in the cleaning operations became ill with headache, vertigo, nausea, and illness lasting several days.

Experiments on mice with various fractions of the distilled substances resulted in finding that the fraction which did not distil over caused deep narcosis after the cages had been smeared with it. Both carbon tetrachloride and chloroform were detected in the poisonous fractions. The authors show the relative anesthetic effects of carbon tetrachloride as 1, trichlorethylene as 1.7, chloroform as 2.2, tetrachlorethane as 9.1. Methane derivatives induce narcosis more readily than ethane derivatives. Blood examinations were made, but without showing any pronounced alteration from normal. A microscopic examination of the organs of the mice that died was not made.—T. M. L.

DUST HAZARDS AND THEIR EFFECTS

Appliance for Determining Instantly and on the Spot the Percentage of Non-Combustible Dust Present in a Sample of Dust Collected from Any Mine Roadway.

E. Witte. Tr. Inst. Min. Eng., 1931, vol. 82, p. 20.

This is the report of a demonstration of an appliance which should be of great utility to mine officials in their efforts to prevent explosions due to coal dust. The "grayness" of a mixture of a given coal dust and a given non-combustible material is a measure of its explosibility. It appears that the grayness is influenced by the fineness of the dusts as well as by their proportions. The apparatus referred to is quite simple in principle and construction, and provides for the matching of the grayness of a sample of dust with that of a disk with sectors of different gray values. For a given kind of coal dust and the particular kind of stone dust used for mixing with it, the dust being of standard fineness, the limit of explosibility is determined experimentally. It follows that every mine would need its own standard data, but with these once ascertained simple

inspection in this appliance will determine whether a sample of dust collected in the mine contains a sufficient proportion of stone dust to render it inexplosive, or, alternatively, how much more stone dust is required in order that the dust may be made safe.—T. B.

REVIEW OF PNEUMONOKONIOSIS: FURTHER ROENTGENOLOGIC AND PATHOLOGIC STUDIES. *H. K. Pancoast and E. P. Pendergrass. Abstr. as follows from Am. Jour. Roentgenol., Oct., 1931, vol. 26, p. 556, in Jour. Am. Med. Assn., Dec. 12, 1931, vol. 97, p. 1828.*

Pancoast and Pendergrass review the subject of pneumonokoniosis from the standpoint of its etiology, its pathology, and its roentgenographic appearances. Pneumonokoniosis is a more or less necessary risk of commercial development in the progress of civilization, but its progress and serious aspects may be lessened by certain preventive measures in most instances. Its incidence in many industries apparently cannot be altogether eliminated. It has aroused widespread interest and has received a great amount of study during the past few years. The roentgenologic examination is the most important and accurate means of detecting its presence, especially in early cases, of studying its progress, and of determining its extent and severity. Rapidity of progression is easily determined by serial study. The authors believe that roentgenology will be employed more and more extensively as the necessity of study of workers in hazardous industries becomes realized and regulations for protection and compensation laws are adopted in this country. The roentgenologist must be experienced in his work and honest in the expression of his opinions. It behooves the roentgenologist to become thoroughly familiar with the subject from every angle. The particular hazards of certain industries must be understood and the roentgenographic appearances more or less characteristic of some of them must be learned. Roentgenographic appearances are the expressions of pathologic changes, and to interpret them properly requires an intimate knowledge of the pathology of the condition. A summary is given of the present exact knowledge of the pathology of pneumonokoniosis based on necropsy study and animal experimentation. Various theories advanced in explanation of some uncertain points are given brief consideration. Various classifications of the degrees of progress of the condition are in use in different countries. Most of these have a clinical basis with which roentgenographic appearances must be made to conform. No one of them seems adequate or entirely satisfactory in its application to every dusty industry, especially from the standpoint of the roentgenologist. The authors propose a new pathologic-roentgenologic classification.

TUBERCULOSIS AND INDUSTRIAL DUSTS. PROPHYLAXIS IN GERMANY. *Hamel. Abstr. as follows from Office internat. d'hyg. pub., Bull. mensuel, 1931, vol. 23, pp. 814–818, in Bull. Hyg., Nov., 1931, vol. 6, p. 798.*

This communication consists of a note presented to the October, 1930, session of the Comité de l'Office International d'Hygiène publique, by Dr.

Hamel, President of the Reichsgesundheitsamt, delegate from Germany. An account is given of the various regulations which provide both for proper aeration and the installation of dust absorbing apparatus in workshops as well as for the protection of employees (by the provision of masks, etc.). Details are given of about fourteen statutes concerning the following: stone workers (in quarries and stoneyards); the employment of women and children in industries using fire clay; industries using phosphates; the employment of women and children in glassworks; polishing in needle factories; industries concerned with cleaning, polishing, and carving of metal objects; cutting of precious stones, etc. The dates of these statutes vary from 1857 to 1913.

In 1929 an Order was passed extending accident insurance to those industrial diseases which gave the highest rate of compensation to workers who contracted tuberculosis ascribable to the dust absorption. These industries were "extraction industries," sandstone, porcelain, and mining industries, and metal polishing, *i.e.*, industries believed to give rise to silicosis with tuberculous complications.—S. R. G.

SOME CASES OF SILICOSIS AMONG WOMEN EMPLOYED IN THE MANUFACTURE OF ABRASIVE POWDER. *S. V. Gudjonsson. Abstr. as follows from Ugesk. f. Laeger, Sept. 10, 1931, vol. 93, p. 926, in Jour. Am. Med. Assn., Dec. 12, 1931, vol. 97, p. 1842.*

Gudjonsson reports six fatal cases of silicosis among women working for years, under primitive conditions, in the manufacture of scouring powder. Of the two survivors, one has marked silicosis; in the other, employed for five or six years, silicosis is not yet clinically demonstrable.

SILICOSIS. *F. V. Meriwether and R. R. Sayers. Oklahoma State Med. Assn. Jour., Oct., 1931, vol. 24, p. 317.*

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

THE ACTION ON THE SKIN OF CERTAIN CHEMICALS USED IN INDUSTRY. *Rodenacker. Abstr. as follows from Dermat. Wchnschr., June 6, 1931, vol. 92, pp. 829–836, in Bull. Hyg., Nov., 1931, vol. 6, pp. 798–799.*

The author cites twenty chemical bodies as injurious—nitrous fumes, phosgene, carbon monoxide, hydrocyanic acid, hydrogen sulphide, benzene, aromatic nitro and amido bodies, dimethyl sulphate, methyl bromide, methyl alcohol, lead, phosphorus, arsenic, chrome salts, manganese, mercury, thallium, uranium, and zinc. Some of these act injuriously on the skin and this action can be grouped under general viewpoints.

The main hypothesis set out is that chemical action depends on disturbance of the oxidative and reduction processes on which cell life depends. Some substances act as reducing, others as oxidizing agents.

Interference with the oxidative life processes in aniline workers leads to hyperkeratoses and epithelioma, just as the mother substances (from which aniline is derived) of tar, pitch, and petroleum lead to direct skin cancer. Phosphorus and arsenic act by their strong reducing action, ultimately

leading to cell necrosis of which the hyperkeratoses of the palms of the hands and soles of the feet are evidence. The skin of an arsenical patient readily lends itself to infection with formation of pustules; herpetic vesicles soon become necrotic—both results pointing to feeble oxidative processes. On the other hand, the bichromates are active oxidizing agents and can only disturb the reduction phase of cell breathing, but just as nitro derivatives are less poisonous than amido derivatives, so the bichromates are less dangerous than arsenic. The author pursues this line of thought in detail in regard to the occasional appearance of erythema, etc., following poisoning by carbon monoxide, hydrocyanic acid, dimethyl sulphate, nitro and amido derivatives of benzene and thallium.

Later he discusses hypersensitiveness and allergy in relation to eczema. Regarding the skin as the mirror of the soul he attributes occurrence of much eczema to psychologic causes—attitude toward compensation and the like. In the same way the critical faculty or attitude of mind of the dermatologist affects his estimate. Thus Chajes of Berlin estimates among 1,750 cases of eczema 53 per cent. as occupational, Oppenheim of Vienna 20 per cent., Prosser White 6 per cent. In America Hazen puts the figure at 20, Knowler at 33, and Gardiner at 68 per cent.

[Much observation has been utilized in this condensed paper.]—T. M. L.

OCCUPATIONAL DERMATOSES DUE TO ARSENIC. *D. Lapysheff. Abstr. as follows from Sovet. Vest. Dermat., Feb., 1931, vol. 9, p. 126, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, pp. 1089–1090.*

The author describes occupational skin diseases in workers who prepare a powder used for the destruction of corn blight which contains 75 per cent. talcum and 25 per cent. of one of the following three arsenic compounds: arsenious acid (As_2O_3), calcium arsenite (Ca_3 $[As_2O_3]_2$) and Schweinfurt-green, a double salt of copper and arsenic ($CuAsO_4$ $[Cu_2H_2O_2]_2$). Of twenty-five workers examined twenty-one had skin affections in the form of acute and subacute eczema, located mainly in the folds of the genitals, axillae, and antecubitals but also on the face and neck. Most of them showed also signs of secondary pyodermia in the form of folliculitis and perifolliculitis. Almost all had hyperemia and erosions of the mucosa of the nose, mouth, and pharynx. The majority showed signs of general poisoning (headache, malaise, and anorexia). In all of them a history was obtained of prodromal sensations antedating the eruption from seven to twelve days. The course was favorable; the patients became well soon after leaving their occupation. The author sees the main cause of these conditions in the technically bad arrangement of the factory and the insufficient sanitary and hygienic measures.

SKIN AFFECTIONS IN CEMENT CARRIERS. *E. Joffe and J. Berlin. Abstr. as follows from Sovet. Vest. Dermat., March, 1931, vol. 9, p. 292, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1093.*

The authors describe three cases of skin burns in cement carriers who carried the cement without protecting

themselves with sacks. The cement powder fell behind their collars and caused an ulcerative dermatitis of the back and the belt region.

SENSITIVENESS OF THE SKIN. SENSITIZATION TO DINITROCHLOROBENZENE THROUGH OCCUPATION. *N. Wedroff. Abstr. as follows from Sovet. Vest. Dermat., March, 1931, vol. 9, p. 226, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1091.*

Twenty-four workers with affections of the skin caused by dinitrochlorobenzene were examined. An alcoholic solution of dinitrochlorobenzene in the concentrations of 0.0001, 0.001, 0.01, 0.1, and 1 per cent. were applied to the skin. All of these workers gave a positive reaction in a different degree according to the concentration, while ninety control subjects who had eczema and other skin conditions reacted negatively to the test. A second skin test one year after the first dinitrochlorobenzene dermatosis cleared up revealed, in the majority of patients, an increased sensibility to this substance which is considered by the author as the result of that dermatosis. Altogether 108 cases of skin affections due to dinitrochlorobenzene were observed by the author at the Obuch Institute (under the direction of Professor W. Iwanow). Of these, eighty-one cases appeared in the form of a circumscribed dermatitis, twenty-five in the form of a toxicodermia, and two presented the picture of eczema.

OCCUPATIONAL CUTANEOUS CONDITIONS IN ENAMEL WORKERS. *A. Dolgow. Abstr. as follows from Sovet. Vest. Dermat., Feb., 1931, vol. 9, p. 114, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1089.*

In forty-two workers (sixteen smelters and twenty-six helpers) at the factory "Elektroswet" the following changes in the skin of the hands were observed: (1) mild erythema with slight scaling (sixteen cases); (2) dermatitis (eighteen cases); (3) eczema (eight cases); (4) ulcerations (four cases); (5) changes in the nails. An analysis of the filtrate of the enamel mixture revealed an alkalinity of from 16 to 32 per cent. of decinormal solution of hydrochloric acid. It was composed of silicic acid, cobalt, nickel, chrome, potassium, sodium, calcium, and aluminium. Functional skin tests according to the method of Jadassohn and Bloch showed specific sensitivity to the enamel mixture and its filtrate. In six of the affected workers tests were made with a 1 per cent. solution of the sulphate of nickel and cobalt; five of the patients reacted positively. These skin affections are caused by the physicochemical properties of the enamel, by the mechanical effect of the particles of enamel, by the chemical effect of its constituents that go over from the enamel into the solution, and finally, by the maceration and rubbing which increase the irritation.

FUNGUS INFECTIONS OF SKIN OF INDUSTRIAL WORKERS. *R. T. Legge. Abstr. as follows from Am. Jour. Pub. Health, 1931, vol. 21, pp. 648–652, in Bull. Hyg., Nov., 1931, vol. 6, p. 799.*

References are first made to cases reported in literature of mycotic infections of either the skin or the lungs. All arose from contact with vegetation, generally in agriculture, but also in

fruit canning, orange juice manufacture, and cotton spinning. Then the author reports upon the prevalence of ringworm of the foot in America, due to Trichophyton interdigitale.—E. L. C.

Occupational Dermatitis Due to Lettuce. *H. J. Rinkel and R. M. Balyeat. Jour. Am. Med. Assn., Jan. 9, 1932, vol. 98, pp. 137–138.*

R. L. T., a woman, aged 43, a salad maker, noted an eruption of the skin, which began about five years ago on the dorsum of each hand and extended to the arms, neck, and face. The lesion when first seen consisted of erythematous, papular, and vesicular eruptions. In some areas there were discrete papulovesicular eruptions. In others they coalesced to form weeping and denuded areas ranging in size from a hazelnut to 1 or 2 inches in diameter. The eruption was most marked on the hands and forearm and about the nose and mouth. From time to time the patient was subject to urticarial eruptions, which would occur over the hand, forearm, arm, neck, and face. She complained of extreme pruritus.

The history was negative as to the occurrence of other allergic diseases in the individual and in her blood relations. The patient had handled large amounts of lettuce in her occupation over a period of the past five years. The past and present history was otherwise irrelevant, and the physical examination gave negative results except for the skin eruption.

The course of the dermatitis was chronic with acute exacerbations. Since there was marked pruritus there were a number of secondary changes due to scratching.

This patient was sent to the authors by the Industrial Commission of the state of Oklahoma, since the insurance carrier had been complaining because it had been paying partial time disability over quite a period.

The usual scratch tests were of no value from a diagnostic standpoint. The fact that the patient gave a history of handling large amounts of lettuce led the authors to use a lettuce contact test, with a positive result. The elimination of lettuce from her diet and the avoidance of contact with lettuce in her work effected a clinical cure.—C. K. D.

Leukonychia *A. Burrows. Proc. Roy. Soc. Med., Dec., 1931, vol. 25, p. 217 (Dermat., p. 7).*

The patient whose case is reported was a butcher who frequently dips his hands in brine. He presented an incomplete leukonychia of both hands. His coworkers, however, were not similarly affected.

Onychia as an Occupational Disease. *H. Haldin-Davis. Brit. Med. Jour., Nov. 7, 1931, vol. 2, pp. 845–846.*

Skin specialists, when dealing with industrial dermatitis, have somewhat overlooked the occurrence of chronic onychia, even though more acute affections of the finger nails are discussed. Chronic onychia is a condition in which the base of the nail becomes thickened into a dull, red, sausage-shaped roll, which encircles the nail and gradually tapers off as it approaches the distal end. An occasional bead of moisture may be expressed, although no great quantity of pus is produced. The nail plate gradually loses its smooth,

polished surface, becomes wrinkled, and even deformed. The occupations concerned are beer bottling, office cleaning, and domestic service, all of which necessitate frequent immersion of the fingers in water, with, possibly, exposure to soda. The condition is sometimes hardly complained of by charwomen, who look upon it as normal to their occupation. Chronic onychia may even result from manicuring, as a result of using the orange stick with excessive vigor.—E. L. C.

ONYCHOLYSIS. AN INDUSTRIAL DERMATOSIS. *H. J. Templeton. Jour. Am. Med. Assn., Dec. 26, 1931, vol. 97, pp. 1950–1953.*

New employees, apparently healthy, developed black spots under their finger nails within forty-eight hours after beginning work washing paste from labeled bottles. Within a few days the nails loosened from the nail-beds at these areas. The process was without symptoms. The nails regrew in from four to six months. Investigations revealed no specific industrial irritants at fault. I believe that the disorder was precipitated by maceration of the tissues by prolonged immersion in water plus, possibly, the mechanical insult to the tips of the finger nails from picking at resistant pieces of paste.

But back of all of this, in my opinion, was some personal factor which made the nails separate from the nail-beds more easily than would those of normal individuals.—*Author's Summary.*

PROCAINE HYDROCHLORIDE DERMATITIS IN DENTISTS. *I. M. Stsherbakoff. Abstr. as follows from Sovet. Vest. Dermat., March, 1931, vol. 9, p. 257, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1092.*

The author reports two cases of eczema in dentists caused by procaine hydrochloride. The first patient was a 56-year-old dentist who had been using cocaine and procaine hydrochloride for thirty years and who had had for one and a half years previous to examination a chronic papulovesicular eruption on the dorsum of both hands. The second patient was a 42-year-old woman dentist in whom, six months prior to examination, hyperkeratosis of the nail-bed, deformities of the nails, and fissures of the finger tips developed. Skin tests in both patients showed a very strong reaction to procaine hydrochloride. Mere touching of the skin with 1 per cent. solution of this preparation produced a strong reaction in the form of an eczema eruption. Another brand of procaine hydrochloride and tutocaine (applied according to the method of Jadassohn) produced the same eruption, while no reaction or only a mild one was caused by cocaine, eucaine hydrochloride, and benzoyl-pseudo-tropein-hydrochloride. Corrosive mercuric chloride in 1 per cent. solution and also solution of formaldehyde (1:100) did not produce any reaction. In the first case passive transference of the hypersensitiveness according to the method of Urbach-Koenigstein was successful. Oral administration of increasing doses of procaine hydrochloride for the purpose of desensitization was of no use. In the second case certain skin regions were exposed to ultraviolet rays and then skin tests were performed in the regions of the skin that reacted negatively.

OCCUPATIONAL STIGMATA. *A. Burrows. Proc. Roy. Soc. Med., Dec., 1931, vol. 25, pp. 216–217 (Dermat., pp. 6–7).*

The case is reported of a laborer in a sugar factory who showed the well-marked interdigital callosities of the sugar worker controlling the plates of the centrifugal machines used in making cube sugar. The skiagram showed no evidence of any bony change.

OCCUPATIONAL CATARACT IN GLASSWORKERS. *J. Badot. Abstr. as follows from Bull. et mém. Soc. franç. d'opht., 1930, p. 33, in Am. Jour. Ophth., Dec., 1931, vol. 14, p. 1293.*

Badot discusses briefly occupational cataract and reports eight representative cases occurring in glassworkers. According to the ages at operation of a series of over two hundred cases, he found 5 per cent. occurring below the age of 40 years, 42 per cent. from 40 to 60 years, and 53 per cent. from 60 to 80 years. This agrees with statistics given by other authors (Wick, Rohlinger).

In a general way three stages in the evolution of this cataract can be described. The first leads to opacity of the posterior lens capsule involving exactly the site of axial projection of the pupil, the remainder of the lens being protected by the iris. The second stage leads to opacity of the subcapsular lens fibers, the nucleus remaining unaffected. The third stage leads to opacity of the anterior and peripheral zones until finally the entire lens is opaque. This type of cataract may be very slow in evolution and may often be unilateral.

The pathogenesis of this disease has been variously ascribed to the action of the intense heat and light, to the excessive sweating, and to the ultra-violet and infra-red radiations. With the increased use of mechanical aids in the glass industry, it is probable that in a few years this type of occupational cataract will be only a memory.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

EXHAUSTING MUSCULAR WORK IN UNTRAINED AND TRAINED CONDITION. *T. Matthies. Abstr. as follows from Arch. f. d. ges. Physiol., 1931, vol. 227, pp. 475–477, in Chem. Abstr., Sept. 20, 1931, vol. 25, p. 4926.*

Exhaustion in an untrained individual was accompanied by depletion of the glycogen store and strikingly low blood sugar values. After training, neither of these conditions was observed.

REST PAUSES AND FOOD ABSORPTION IN HEAVY BODILY WORK. *B. Engelmann. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 217–226, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Nov. 4, 1931, vol. 62, p. 329.*

In the case of a workman performing a heavy agricultural task (digging), the utilization of food materials was studied for a month in order to determine whether absorption would be improved by rest intervals after the principal meal. It was found that the absorption of protein, fat, and carbohydrate was not impaired by resuming work immediately after mealtime, and that it could not be improved by a

longer rest interval. The behavior of the absorption cannot be used as a basis for establishing the necessity of a rest interval after eating.—A. M.

THE EFFECT OF INDUSTRIAL WORK ON THE ACID-BASE EQUILIBRIUM OF THE BLOOD. *B. D. Krawtschinsky. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 259–267, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Nov. 4, 1931, vol. 62, p. 329.*

The alkali reserve and the lactic acid concentration of whole blood were investigated in some 100 foundry and lathe workers before and after an eight-hour work period. Following the work a compensatory acidosis existed in every workman, which was expressed in a lowering of the alkali reserve and a rise in the lactic acid concentration. The variations ran parallel to the difficulty of the daily work done.—A. M.

THE EFFECT OF TWO WORK SHIFTS IN A SMITH'S TRADE ON THE ORGANISM OF THE WORKMAN. *B. D. Krawtschinsky. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 268–277, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Nov. 4, 1931, vol. 62, p. 329.*

In the smith's work investigated, an average of 6, and a maximum of 8 to 9 liters of sweat were excreted daily. In spite of the drinking of an average of 5 liters of water, there existed a strongly negative water balance. In the sweat 7 to 8 gm. of lactic acid and 15 to 20 gm. of chloride were excreted; in the urine only 7 to 8 gm. of chloride. The chloride content of the blood, however, was unchanged. In all, from 2 to 2.5 gm. of ammonia were excreted, 1 to 1.5 gm. of which were in the sweat. In the night shift, although it lasted a somewhat shorter time, there was greater elimination of lactic acid, ammonia, and chloride. In addition, the acid titer of the urine and the excretion of creatinine were greater in the night shift than in the morning shift.—A. M.

AN INVESTIGATION OF THE OPTIMUM CONDITIONS FOR A HAMMER STROKE. *S. J. Philippowitsch. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 278–292, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Nov. 4, 1931, vol. 62, p. 330.*

Work with heavy hammers (2 to 7 kg. in weight) in a complete excursion was investigated. The external work performed was figured as $\frac{m}{2}v^2$, where the velocity v was obtained by a chronocyclographic determination. A hammer weighing 5 kg. was used most efficiently at 45 strokes per minute. The relation of the oxygen consumed during the work to the recovery oxygen was taken as the criterion. A tempo under 35 strokes per minute is not favorable. Smaller hammers consume too much energy in useless motion. Too heavy hammers (7 kg. in weight) are not rational because the required stroke velocity cannot be maintained. —A. M.

THE DYNAMICS OF BLOOD PRESSURE UNDER THE INFLUENCE OF PHYSICAL WORK. (OBSERVATIONS ON PERSONS ENGAGED IN STRENUOUS ATHLETICS). *S. Mindlin, I. Bernštein, and A. Šulgin. Abstr. as follows from Ter. Arch., 1930, vol. 8, pp. 443–466 (German Summary p. 466), in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., July 29, 1931, vol. 60, p. 571.*

After severe bodily exertion, the systolic blood pressure was found to fall, but it returned to its normal level in about fifteen minutes after the exercise. The diastolic pressure also decreased after work, but it returned to normal somewhat more quickly than the systolic pressure. Thus, immediately after work, there occurs first an increase in pressure and then a decrease.—L.C.B.

FATIGUE IN SOLDIERS DUE TO CHLORIDE LOSSES: REPLACEMENT THROUGH USE OF SODIUM CHLORIDE IN DRINKING WATER. *C. P. McCord and T. L. Ferenbaugh. Abstr. as follows from Mil. Surgeon, Dec., 1931, vol. 69, p. 608, in Jour. Am. Med. Assn., Jan. 30, 1932, vol. 98, p. 431.*

McCord and Ferenbaugh call attention to the fact that under suitable conditions as to temperature, humidity, muscular exertion, and at times emotional state, as much as 6 liters of fluids may be lost from the adult human body in a single twenty-four-hour period. However, the average daily loss of body fluids as sweat, under conditions of muscular exertion and heat, is much less, and under conditions attending most occupations does not exceed 3 liters. The chloride content of sweat is not constant, varying in different body areas and with the duration of sweating. As sweating is prolonged, the percentage of chlorides increases. The extremes established under experimental conditions on human beings are: minimum, 4.3 mg.; maximum, 8.3 mg. per cubic centimeter of sweat. The average proved to be 6.5 mg. In any assumed instance in which the chloride content is average (6.5 mg. per cubic centimeter) and in which the sweat output is 3,000 c.c. during the twenty-four hours, the loss of chlorides from the body approximates 20 gm., an amount that certainly may not be replaced by chlorides normally in foods and drinks. Excessive and prolonged sweating eventuates in dehydrated tissues, gastric hypo-acidity, acidosis, fatigue, exhaustion, and muscular and gastro-intestinal cramps. These conditions are not alleviated by water alone and are in fact in some measure aggravated by water intake. Salinized drinking water (sodium chloride from 0.25 to 1 per cent.) goes far in the prevention and control of that form of fatigue or exhaustion occasioned by mineral losses from the body. Military training in some of its aspects, together with actual warfare, may be carried out under conditions far from optimum as to heat, humidity, body exertion, and emotional stress. Human physical capacity is markedly lowered as the result of attending fluid and mineral losses. Betterment is immediately brought about through the use of compensating salines as drinking water for the purpose of satisfying the existing mineral hunger.—C. K. D.

PHYSICAL PERFORMANCE IN RELATION TO EXTERNAL TEMPERATURE. *D. B. Dill, H. T. Edwards, P. S. Bauer, and E. J. Levenson. Arbeitsphysiol., 1931, vol. 4, no. 6, pp. 508–518.*

The effects of external temperature on performance have been studied in the case of several individuals. Each subject did the same work on the bicycle ergometer with (*a*) an external temperature of 12 ± 1°C. and (*b*) an external temperature of 34 ± 1°C. and a relative humidity of about 50 per

cent. in each case. The work done involved an oxygen consumption of 1.9 ± 0.5 liters per minute and a moderate or small oxygen debt. Rectal temperature was observed frequently, using a thermocouple, and heart rate was recorded continuously with a cardiotachometer. Observations on the metabolism indicated that work is carried on with the same mechanical efficiency and with the same fuels under these extreme conditions.

For a given rate of work the rate of increase of body temperature as work is carried on is nearly constant for the first few minutes. Then a constant temperature may be reached if conditions for heat dissipation are favorable; otherwise body temperature rises until exhaustion intervenes.

The heart rate increases with external temperature even when internal temperature is the same. Its output per unit time may remain constant or increase slightly. Consequently its output per beat must diminish with increasing external temperature. Blood supply to the skin and inactive muscles increases and to active muscles probably diminishes with increasing external temperature.

In our experiments four of the five subjects became exhausted at the high temperature when doing work which they carried on easily at a low temperature. Yet there was no considerable lactic acid accumulation in the body as a whole, no exhaustion of fuel reserves, and a large unused reserve of pulmonary ventilation. The most probable hypothesis for explaining these data is that the heart muscle itself had reached the limit of its capacity, for it had attained its maximum rate while no other part of the organism was working at capacity.

The implications of these experiments are many, for physical activity is often carried on under conditions unfavorable to heat dissipation. The leisurely habits of those who live in the tropics have a sound basis in physiologic necessity.—*Authors' Summary.*

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

TYPICAL INDUSTRIAL ACCIDENTS CAUSED BY ELECTRICITY, AND THEIR PREVENTION. *K. K. Wolter. Abstr. as follows from Zentralbl. f. Gewerbehyg., Feb., 1931, N. S. vol. 8, pp. 44–49; March, 1931, pp. 75–80, in Bull. Hyg., Aug., 1931, vol. 6, p. 603.*

The author has brought together from the reports of the German factory and mines inspectors for the years 1926 to 1928 inclusive a number of accidents due to electricity. Sufficient details are given of each one to understand the cause. He divides them (66 in all) into those due to high tension installation: (*a*) bare wiring (7); (*b*) cells and switches (8); (*c*) machines, apparatus, etc., (12); and low tension: (*a*) bare wiring and house connections (8); (*b*) machines and apparatus (10); (*c*) insulated wires and cables (7); (*d*) portable and hand lamps (7); and (*e*) lifting apparatus, distributing switchboards, etc. (7).

The high tensions vary for the most part from 10,000 to 100,000 volts, and many of the low tensions are at a voltage of 220, but one is at 110.

Each accident is treated individually with observations as to its prevention.

This is a useful paper for those concerned with electrical installations.—T. M. L.

THE PRODUCTION OF FIBRILLATION OF THE HEART BY HIGH FREQUENCY ALTERNATING CURRENTS. *R. Bodó and G. Orbán. Abstr. as follows from Arch. f. d. ges. Physiol., 1931, vol. 227, pp. 309–321, in Physiol. Abstr., Jan., 1932, vol. 16, p. 610.*

The effectiveness of various types of currents in bringing about fibrillation in the dog's heart *in situ* was investigated. High frequency currents can bring about fibrillation. In a 10-kg. animal the initial current with a frequency of 1,000,000 is 10 amperes, with a frequency of 500,000, 7 amperes; fibrillation occurs within two minutes. With a frequency of 50, the minimal current is 1.1 milliampere. Constant currents cause fibrillation immediately, the normal lethal current being 2 milliamperes. With alternating currents of frequency 50 and with induced currents, recovery of the heart was observed in the experiments in which the normal cardiac contractions had not completely disappeared.—C. K. D.

INJURIES TO THE NERVOUS SYSTEM PRODUCED BY LIGHTNING. *F. Panse. Monatschr. f. Psychiat. u. Neurol., 1925, vol. 59, pp. 323–350.*

INJURIES TO THE NERVOUS SYSTEM PRODUCED BY ELECTRICITY. WITH REMARKS ON DEATH DUE TO ELECTRICITY. *F. Panse. Beiheft z. Monatschr. f. Psychiat. u. Neurol., vol. 59. Berlin, S. Karger, 1930, pp. 155.*

INJURIES TO THE NERVOUS SYSTEM PRODUCED BY ELECTRICITY. *F. Panse. Monatschr. f. Psychiat. u. Neurol., March, 1931, vol. 78, pp. 193–213.*

Panse (1925) found that lightning produced abnormalities in the central nervous system that were usually rather transient. He collected data concerning twenty-one persons injured by a lightning discharge. Almost all of them were unconscious for a short time following the shock. Many suffered severe burns causing great pain. There was often a transient paralysis and a loss of sensation in one or more extremities, which cleared up in a few hours or a few days. Autonomic irritation was demonstrated by abnormalities in sweating and in vasomotor control. Functional disturbances varied from sleeplessness on the first night after the accident to rather severe psychotic manifestations.

Panse in 1930 and 1931 discussed the injuries produced in the nervous system of man as a result of electric shocks. Shocks from high voltage circuits, where the amount of current is considerable, seldom cause permanent damage to the nervous system. However, there are many cases of low voltage and light shocks where a definite injury is produced. The current path and current density in the body play an important rôle, and the effects produced in the nerve cells show clearly the path followed by the current through the body.

Panse was able to collect a group of twenty-nine cases showing characteristic signs of muscular atrophy in one or more extremities following electric injury. The atrophy ranged from the slightest to the severest types. In all of these cases injuries were produced on circuits that had voltage ranges from 75 to 1,000 volts and, in his

opinion, the current values were relatively small owing to poor contacts. In twenty of the twenty-nine cases the subject was not rendered unconscious. Of the remaining cases, five were unconscious for a very short time, one for only a moment, and the others for longer times, running into hours. These cases are different from those experienced on high voltage circuits which are usually characterized by long periods of complete unconsciousness accompanied by irritation of the motor nerves. Panse states that the failure of unconsciousness to follow the shock does not mean that no appreciable injury has been produced in the nervous system.

The abnormalities took from several days to several months, and in one case more than a year, to develop. The atrophy was usually preceded by pain and paresthesias in the extremity and was accompanied by vasomotor disturbances. Often the pyramidal tracts were also involved, giving a typical picture of amyotrophic lateral sclerosis. Atrophy of the bulbar muscles may also occur so that a bulbar palsy ensues. Ataxia has been observed in certain cases. Atrophy, in rare instances, follows a lightning discharge. In twenty-three of the twenty-nine cases the current passed through one or both arms and produced the greatest damage in the lower cervical segments of the cord. The medulla was involved in two cases, and four showed amyotrophic lateral sclerosis. Several cases showed pyramidal tract injury without atrophy; the spasticity may involve all four extremities.

Intense motor and sensory disturbances may follow the injury of a peripheral nerve in the direct pathway of the current. The nerves may be caught in burns or scars. The pain in the extremity is often spoken of as a neuritis. Peripheral facial palsy is due perhaps to a swelling and compression of the nerve in the facial canal.

When the current passes through the head, sequelae may simulate any type of neurologic disease according to Panse. Unconsciousness, amnesia, and headaches are common. Convulsions may follow the shock. Often abscesses form under the necrotic bone or actual burning may extend through the dura to the cortex of the brain. Hemiparesis, aphasia, and the Parkinsonian syndrome have developed after electric injuries.

These data of Panse are very interesting and important but they must be examined rather critically. The neurologic abnormalities followed the shock after latent periods of weeks or months. In the literature of English speaking countries no records of atrophies or spasticities following electric injuries have been found. They must be watched for carefully in the future. Certainly in any litigation it would be difficult with the data at hand to prove the relation of cause and effect.—O. R. L.

WOMEN AND CHILDREN IN INDUSTRY

THE POSITION OF WOMEN WORKERS IN GERMANY FROM THE SOCIAL AND HEALTH ASPECT. *W. Bohnstedt. Abstr. as follows from Arch. f. soziale Hyg. u. Demographie, 1931, vol. 6, pp. 154–159, in Bull. Hyg., Oct., 1931, vol. 6, pp. 743–744.*

Of recent years female labor has

increased considerably in Germany. In 1925 out of 14,500,000 workers, 3,500,000 were women, and of 3,600,000 workers employed as clerks and shop assistants 1,200,000 were women. The number of widows employed in factories has increased very much since the war. The wages are small compared with those of a man. In the textile industry a woman earns from 21 to 25 RM. a week, and in the tobacco industry from 16 to 20 RM. As a rule women aged from 17 to 19 years do not earn more than 100 RM. a month, and older women more than 140 RM. a month. The hours of work are usually from forty-eight to fifty-two a week. Many women do piecework at home, where they are helped by their daughters. In many of the small factories there are no separate cloakrooms and lavatories for women, and the proportion of water-closets for women is too low. There is need of legislation requiring seats to be provided for shop assistants. A table is given showing the number of weeks pregnant women avail themselves of ceasing work and drawing from 50 to 75 per cent. of their basic wage. About 35 per cent. availed themselves of this arrangement for periods of more than six weeks, and about 25 per cent. for only one week.—A. J. C.

TREATMENT OF DYSMENORRHOEA BY EXERCISE. *A. E. S. Clow. Brit. Med. Jour., Jan. 2, 1932, vol. 1, pp. 4–5.*

Dr. Clow presents a table of exercises which she uses in the treatment of dysmenorrhea in patients whose general health is good. These are printed on a separate sheet for distribution. There is a special leaflet for girls and women engaged in industrial occupations.

INDUSTRIAL ENVIRONMENTAL CONDITIONS

THE INSTITUTION OF MINING ENGINEERS, DISCUSSION ON LIGHTING IN MINES. *Tr. Inst. Min. Eng., 1931, vol. 82, p. 73.*

Photometers.—The standard candle is liable to vary in candle power throughout its burning period, and observational errors are introduced owing to color differences between the candle and the lamp under test. The mean error of a simple photometer using the standard candle was found to be not less than 10 per cent., and individual readings were liable to a 25 or 27 per cent. error.

Coal Face Lighting from Power Mains.—As the result of experience with this type of lighting it was stated that such lighting is now an economic proposition under certain conditions. The cost of installation is small, and current consumption is low when compared with other power used at the face.

Illumination and Miners' Nystagmus.—Higher-powered lamps were supplied to men suffering from nystagmus. At first they complained that they were dazzled, but later they spoke highly of the improved light, and the number of cases of nystagmus began steadily to decrease.—T. B.

COMPARATIVE PHOTOMETRIC TESTS OF MINERS' ELECTRIC HAND LAMPS. *W H. McMillan. Tr. Inst. Min. Eng., 1931, vol. 82, p. 46.*

The photometric requirement for an

electric safety lamp at present is that it shall give a light of not less than 1 candle power all around in a horizontal plane throughout a period of not less than nine hours, and it must also be capable of giving a light of not less than 1.5 candle power over an arc of 45° in a horizontal plane.

The average of a large number of tests of 2-volt lead acid lamps gave a mean horizontal candle power of 0.7 at the beginning and 0.5 after nine hours' burning, and it is said that this is representative of the efficiency of a very large proportion of the electric hand lamps in general use. Evidently the lamp in general use does not comply with the requirements of the existing photometric test. Strict adherence to the test would result in an improvement of at least 100 per cent. in most mines where the electric hand lamp is the chief source of illumination.

A 2-volt cap lamp gave a maximum horizontal candle power of 0.82 when tested without the fitting. Tested in its fitting (aluminium mat reflector and clear glass) a beam candle power of 3.82 and an average horizontal candle power of 1.71 over 120° were obtained. When the light was still further concentrated with a bull's-eye glass, the beam candle power was increased to 7.37, but the solid angle over which a useful light was given was reduced to about 60°.

By the use of specially shaped glasses, the mean horizontal candle power of the hand electric lamp can be increased by 40 per cent.; if reflectors are used, increases in maximum candle power of over 100 per cent. can be obtained, and in average horizontal candle power increases up to 60 per cent. over the actual area of distribution. It is doubtful, however, whether the distribution of the light can then be looked upon as sufficient and suitable.

Colored glasses, which are often used in the electric hand lamp, absorb a large proportion of the useful light. Whereas the loss of light with a lightly frosted glass was 6.6 per cent., the loss with lightly frosted but tinted glasses ranged from 21 per cent. for a green glass to 40.8 per cent. for a violet one.

Attention is drawn to the importance of the shape of the bulb filament in affecting the efficiency of the distribution of the light. A vertical filament gives the best distribution.

Stress is laid on the need for sensitive apparatus in making accurate candle power determinations with such low intensities as are given by the miners' lamp.—T. B.

THE CANDLE POWERS OF SAFETY-LAMPS BEFORE AND AFTER UNDERGROUND SHIFTS. *T. D. Jones and C. E. Morgan. Tr. Inst. Min. Eng., 1931, vol. 82, p. 43.*

This paper gives the results of some thousands of tests of the illumination from miners' lamps, but it is a pity that the authors have been content with simply describing their method of examination and recording their results. An analysis of their data would have been instructive.

The tables, generally, show a marked decrease in candle power at the end of a shift, but the percentage decrease varies enormously at different collieries. Evidently there are wide variations in the efficiencies of lamp room staffs. The maintenance of safety lamps is not what it should be.—T. B.

THERMAL ADJUSTMENT OF MAN AND ANIMALS TO EXTERNAL CONDITIONS. *C. J. Martin. Lancet, Sept. 13, 1930, vol. 2, pp. 561–567; Sept. 20, 1930, pp. 617–620; Sept. 27, 1930, pp. 673–678.*

This excellent review on heat regulation was delivered by the author in his Croonian Lectures to the Royal College of Physicians of London. The first two lectures deal largely with physical and chemical regulation, including the nervous mechanism of thermotaxis, the central coordinating mechanism, and the rôle played by internal secretion of thyroid and suprarenal glands in heat regulation.

In the third and last lecture, the author discusses the strain placed upon the respiratory and circulatory systems during muscular work in high air temperatures. The matter of clothing is held to be a serious obstacle to work in hot climates. The European sense of dignity makes it hard for workers to expose themselves unclothed, and their garments impose a heavy load on the heart, which in addition to furnishing oxygen to the active muscles must also perform the functions of a refrigerating plant in order to cool the body.

The bibliography, while excellent, is not quite up to date.—C. P. Y.

MANUFACTURED WEATHER. *J. S. Jones. Jour. Roy. San. Inst., Nov., 1931, vol. 52, pp. 201–207.*

The author discusses the influence of atmospheric environment upon the human body, and points out that the optimum conditions for comfort and health coincide; when bodily comfort is satisfied, the mind can apply itself efficiently to work. The engineer, by conditioning the air, has to provide an atmosphere which shall enable the cooling of the body to be effected in the healthiest and most comfortable manner possible. In other words, he has to manufacture weather in the interests of industrial health and efficiency. The health and comfort of workers demand a relative humidity of the air between 40 per cent. and 65 per cent., while the temperature lies between 65° and 75°F. Weather can now be manufactured which enables workers to carry out their duties in atmospheres more favorable to their health and comfort than those found in most of their homes; further, it can be applied to the conditioning of large cow milking rooms, and of hospitals, and particularly for operating theaters.—E. L. C.

VENTILATION AS A PHYSIOLOGICAL PROBLEM. *R. C. Garry. Jour. Roy. San. Inst., Nov., 1931, vol. 52, pp. 208–216.*

The adjustment of external working environment by means of ventilation is of great moment, and frequently of immense difficulty. Evidence demonstrates that ventilation and industrial efficiency are intimately related. Much evidence is quoted in favor of the statements made, to establish both that favorable atmospheric conditions improve health and efficiency, and that poor ventilation is inimical to work, health, and physique. The human body, exposed to such an unfavorable surrounding, becomes a soil in which the organisms of disease can flourish. —E. L. C.

THE VENTILATION OF FACTORIES AND WORKSHOPS. *L. Ward. Jour. Roy. San. Inst., Nov., 1931, vol. 52, pp. 196–200.*

This short article is particularly clear and useful. First it gives a condensed summary of present day statutory requirements regarding ventilation in English factory law. Next, methods of dealing with injurious dust, gas, or vapor arising from manufacturing processes are classified. Finally, the essential features of mechanical means for dealing with injurious dust, gas, or vapor are succinctly outlined.—E. L. C.

CLIMATE AND WORK. II. THE EFFECT OF STILL AND MOVING WARM AIR ON THE COOLING OF UNCLOTHED WORKMEN. *W. Strauss and K. Walther. Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg., Jan., 1931, vol. 1, pp. 634–655, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., July 29, 1931, vol. 60, p. 571.*

Three healthy men were put to work under ordinary conditions of temperature and humidity and in warmer environments in which the air movement was varied from 0 to 2 meters per second. The work was done on an arm ergometer at rates varying from 6,500 to 7,800 kg.m. in forty-five minutes.

Observations of mouth and skin temperature, pulse rate, and lung ventilation rate showed no definite relationship to the environmental conditions. The authors assume that the healthy organism responds to a strong air movement with a reduction in the water output from the skin. A definite conclusion to this effect was reached about three years ago from experiments by Houghten in Pittsburgh and by Leonard Hill in England. —L. C. B.

FRESH AIR INLETS TO FACTORY WORKROOMS IN CONNECTION WITH EXHAUST SYSTEMS. *J. H. Vogt. Abstr. as follows from Indust. Hyg. Bull., June, 1931, vol. 7, pp. 45–47, in Bull. Hyg., Nov., 1931, vol. 6, p. 797.*

Fresh air inlets are needed to enable exhaust ventilation to act; but workers must not be subjected to a draft of air having a temperature of more than 10° below the heat of the room, or a velocity of more than 250 feet per minute. Drafts may be minimized by providing several inlets rather than a single window; special ducts may be needed for the purpose. When exhaust is locally applied for removing fumes, special ducts from without may be used to discharge air locally so that the exhaust does not cool the room in winter by sucking out warm air; throughout, air inlets are fundamental to exhaust ventilation and require planning as carefully as the openings of the exhaust ducts and the rapidity of the outgoing air currents. Unit heaters may be used to warm the incoming air.—E. L. C.

METHODS OF IMPROVING THE KATA CONDITIONS OF ATMOSPHERIC AIR IN DEEP-LEVEL MINES. *A. L. Egan. Engin., 1931, vol. 132, no. 3429, pp. 448–450.*

This paper makes a further contribution to the study of the reduction of mine air temperatures. A machine is described which has been developed for local air reconditioning in the hot and humid mines of the Witwatersrand. The apparatus, which is intended for the local dehumidifying of air in hot places, is electrically driven and makes use of both compression

and expansion stages of dehumidification. It can deal with about 3,000 cubic feet per minute of hot mine air saturated at 95°F., discharging it saturated at 32°F. When the cooled air is mixed with the hot, saturated air of the working place fog must occur, but the mixing reduces the temperature and the absolute humidity, with consequent increase in cooling power. It is said that the improvement in working conditions is very evident and is considered satisfactory, though actual figures are not yet available. A further paper giving detailed results of the improvements effected will be awaited with interest.

Secondary advantages of reconditioning, verified by actual tests, are that (1) some carbon dioxide is dissolved by the condensate; (2) the treated air is cleansed of silica dust; and (3) the high temperature of compression has a powerful germicidal effect.—T. B.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

ACTIVITIES OF SILICOSIS JOINT COMMITTEE. COUNTY OF CUMBERLAND. *Fourth Ann. Rep. Workers' Compensation Commission of New South Wales, July 1, 1929 to June 30, 1930. Sydney, 1931.*

This is the third annual report of the Committee, and contains statistical information for the whole period, which gains in interest as the data accumulate. Out of 2,183 medical examinations, silicosis in some degree, with or without tuberculosis, was found in 10.4 per cent.; of these, 77 were stonemasons, 37 were quarrymen, 42 were rock choppers, and 71 were sewer miners. When distributed according to industrial history, no cases were found among 59 stonemasons with less than ten years' occupational history; there were 22 out of 144 men with from ten to thirty years in the trade; but when the occupational history was thirty years and over, out of 125 masons 54, or 43.2 per cent., were found affected. Among 15 of the last-named group with fifty years and over in the industry, 4 had marked silicosis and 4 others silicosis with tuberculosis. The figures are somewhat similar for quarrymen, where 1 case was found out of 157 men with less than ten years' occupational exposure; 17 cases were found among 107 men who had been working between ten and thirty years, while there were 17 cases among 29 men who had worked between thirty and fifty years. High as these incidences are, it is a remarkable fact that out of 69 men giving a history of forty years or over, 30 were not affected by silicosis at all; one mason with a history of fifty-five years and two others with fifty-two years showed no signs of silicosis clinically or radiographically. This report is concerned mainly with the compensation aspect of the disease, and gives details of the financial side of the silicosis scheme which the Committee administers.—E. L. C.

COMPENSABLE DISABILITY IN OCCUPATIONAL DERMATOSES. *H. E. Alderson. Arch. Dermat. and Syph., Sept., 1931, vol. 24, pp. 401–403.*

Dr. Alderson is chairman of a Refer-

ence Board appointed by the medical director of the Industrial Accident Commission of California to formulate answers to certain questions related to cutaneous sensitization. This action was taken partly on account of a case which had recently been appealed and partly because the Commission desired to have an authoritative opinion to guide them in handling other cases.

The case appealed was that of a man who, after working as a painter for six years, developed severe dermatitis venenata of the parts exposed in his work. It was decided that the trouble was due to turpentine, paint, and other material to which he was exposed. The dermatitis cleared up under treatment but fresh attacks occurred subsequently when the patient returned to his work. The Commission decided that disability ceased with the subsidence of the acute symptoms and that the susceptibility that remained was a personal idiosyncrasy of the individual.

The questions submitted to the Board, together with the answers, are reported in full.

Alderson states that although many cases of alleged sensitization to turpentine have come to his notice, he has never seen one in which he felt that the case was fully proved. He believes that "if sensitization to turpentine can be demonstrated, it is going to place a great financial burden on insurance companies and an enormous number of workers will be classed as 'poor industrial risks.' "

ANALYSIS OF 1,000 EXAMINATIONS OF EYES FOR COMPENSATION PURPOSES. *M. Davidson. Abstr. as follows from N. Y. State Dept. Labor, Indust. Bull., May, 1931, in Sight-Saving Rev., Sept., 1931, vol. 1, p. 64.*

In analyzing 1,000 claimants for eye compensation, the writer, staff ophthalmologist in the New York Office of the Division of Workmen's Compensation, not only presents technical studies on methods of examination, but he finds that: (*a*) malingering is not so frequent as generally believed; (*b*) acceptance of 20/20 as normal vision works to the disadvantage of many claimants whose normal vision exceeds this amount; (*c*) definite diagnosis of visual loss due to hysteria or neurosis should be made only when supported by a neurologist; and (*d*) a standard test type and form of illumination is advisable.

COMPENSATION FOR INJURIES OF THE EYE. *S. R. Gifford. Abstr. as follows from Illinois Med. Jour., April, 1931, in Sight-Saving Rev., Sept., 1931, vol. 1, p. 66.*

The physician who is called upon to testify to eye injuries for compensation insurance must carefully study the eye in fairness to the injured party and in fairness to the defendant. Firms or insurance companies which have made a previous record of the plaintiff's vision are protected from the claim that the injury has diminished sight, when frequently the sight is as it always was, and eye examination following the accident has only focused attention upon it. Pointing out the main injuries to the eye, and suggesting tests to determine the severity, the author warns against malingerers who claim loss of vision and suggests ways of determining the truth of their claims.

TRAUMATIC NEPHRITIS. *F. Schörcher. Abstr. as follows from Deutsch. Ztschr. f. Chir., Sept. 5, 1931, vol. 232, p. 714, in Jour. Am. Med. Assn., Dec. 5, 1931, vol. 97, p. 1748.*

Schörcher reports the clinical history of a man in whom bilateral glomerular nephritis developed after a trauma, which the man sustained by a fall over a pole, while ski running. The nephritis resulted in a contracted kidney. The author further discusses the various conditions that may cause nephritis and also the relations between trauma and nephritis, and he thinks it possible that a trauma may be the only cause of a nephritis. He considers three possibilities in which a traumatic nephritis may develop: by a prolonged spasm of the renal vessels, by formation of nephrotoxins, and by a local reduction of the resistance power. It is also possible that all these factors combined lead to nephritis.—C. K. D.

"SEVERE" FORMS OF SILICOSIS IN INDUSTRIES NOT INCLUDED IN THE GERMAN ORDER OF 11:2:1929. *A. Flatzeck-Hofbauer. Abstr. as follows from Zentralbl. f. Gewerbehyg., May, 1931, N. S. vol. 8, pp. 116–120, in Bull. Hyg., Oct., 1931, vol. 6, p. 746.*

As the principal of a tuberculosis after-care sanatorium in Bavaria, the author was asked to examine ten granite workers employed from thirty-one to forty-nine years, in order to determine to what degree they might be suffering from silicosis. In seven the degree of silicosis could be described, in his opinion, as "severe," and in five of these it was accompanied by tuberculosis; the eighth was "moderate to severe." Only one was free from signs. Details are given of all the cases, with X-ray photographs of three.

A further severe case is described in a man of 53, employed in a glass-works, forming not glass but very fire resistant crucibles from refractory materials into which the molten glass was poured. In the manipulation of these, much silicious dust was given off.

[The point of this paper is that the Compensation Order is limited to severe silicosis in workers in *sandstone;* granite workers are excluded at present. Recently, after full inquiry in Great Britain, granite workers have been brought under the 1931 Sandstone Industries Silicosis Scheme.]—T. M. L.

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES IN THE FIRST QUARTER OF 1931. *D. K. Brundage. U. S. Pub. Health Rep., July 31, 1931, vol. 46, pp. 1799–1800.*

"All through the year 1930 a favorable health record was indicated from reports of a group of industrial sick benefit associations covering about 135,000 male industrial employees. Reports from the same establishments during the first quarter of 1931 showed a continuation of low sickness incidence rates for the more important disease groups with the exception of influenza. In January and February of this year, it will be recalled, a widespread outbreak of influenza occurred. No other important respiratory disease, however, with the possible excep-

tion of tuberculosis of the respiratory system, appears to have occurred among these workers as often during the first three months of 1931 as in the same period either of 1930 or 1929. Since influenza and pneumonia generally fluctuate together, the low rate of pneumonia in the first quarter of this year is noteworthy. Declining industrial activity, especially in the iron and steel industry, where an abnormal incidence of pneumonia appears to be associated with certain occupations, may tend to reduce the occurrence of this disease among a group representing the factory payroll of several of the larger industries of the country."

For each one of the nonrespiratory disease groups, with two exceptions, a lower incidence rate was indicated for the first quarter of 1931 than for the same period of 1930 and 1929. A rather considerable decrease appears to have occurred in the incidence of diseases of the digestive system and in diseases of the skin.

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES IN THE SECOND QUARTER OF 1931. *D. K. Brundage. U. S. Pub. Health Rep., Oct. 16, 1931, vol. 46, pp. 2499–2502.*

The sickness incidence rate among a sample group of male wage earners, based on reports to the Public Health Service from industrial sick benefit associations, was lower in the second quarter of 1931 than in the same quarter of 1930, which rate in turn was lower than that of the second quarter of 1929. The decrease in the frequency of sickness, exclusive of accidents, was 12 per cent. from the 1930 to the 1931 period under consideration, and 11 per cent. from 1929 to 1930.

Virtually all disease groups participated in the decline in incidence. Diseases of the respiratory system as a whole decreased 19 per cent. in the second quarter of 1931 as compared with the same quarter of 1930, and 29 per cent. when compared with the rate during the corresponding period of 1929. The reported frequency of influenza decreased about 20 per cent. as compared with the same period of either of the two preceding years. The incidence of pneumonia was lower by 21 per cent. than in the second quarter of 1930, and by 41 per cent. than in the same period of 1929. Decreases of similar magnitude were recorded for bronchitis, and for tonsillitis and other diseases of the tonsils and pharynx. Even for tuberculosis of the respiratory system the indicated frequency of new cases was lower in the 1931 period than in either of the two preceding second quarters.

The rate for total nonrespiratory diseases, which seldom fluctuates to any marked extent, was 8 per cent. lower in 1931 than in 1930, and 17 per cent. below the 1929 frequency. Diseases showing the most marked decreases in this group include diseases of the stomach (exclusive of cancer), appendicitis, diseases of the skin, and the rheumatic group.

For three disability categories, however, the 1931 rates were definitely above those of each of the two preceding periods. In one of these three groups, namely, nonindustrial injuries, a higher rate this year is to be expected, because, as fewer hours are spent in the factory, the time during which men are

exposed to accidents outside the workshop, obviously, is increased. The other two disability categories showing increased incidence were (*a*) neurasthenia and (*b*) certain other diseases of the nervous system.

MORTALITY RATES AND CAUSES OF DEATH AMONG 318,071 ESTATE LABORERS IN SUMATRA [DUTCH EAST INDIES] IN 1929. *B. M. van Driel. Abstr. as follows from Meded. Path. Lab. t. Medan-Sumatra, 1930, no. 9, pp. 5–64, in Bull. Hyg., Oct., 1931, vol. 6, pp. 750–751.*

This report deals with the mortality experience of over 300,000 laborers on estates in Sumatra. Of the total deaths 84 per cent. occurred in hospitals wherein medical certification of the cause of death was available. All the indentured laborers were within the ambit of the statistics but only a part of the non-indentured laborers. The ages of the workers exposed to risk were not precisely known, but reasons are given for believing that a majority of the men were between 20 and 45 years and a majority of the women under 30 years. The death rate for 1929 was 7.2 per 1,000 for the whole indentured labor force; the extremes were 6.5 for Javanese women and 19.5 for Tamils. If, however, cases of invaliding out on account of probable mortal illness (tuberculosis, nephritis, malignant growths, heart disease) are also debited to the laborers exposed to risk, the general rate rises to 9.6 and the extremes are 7.4 and 23.8. It is suggested that comparison might be made with the English experience of agricultural laborers. The rate of mortality of agricultural laborers aged from 20 to 55 according to the last decennial analysis (1921 to 1923) was 4.5 per 1,000, so that the East Indian result is rather more than double the English figure, not at all an unfavorable result since one is dealing with Asiatics working under tropical conditions. Detailed tabulations of the causes of death are provided. Tuberculosis and other diseases of the respiratory system are the largest contributors.—M. G.

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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GENERAL

THE PRACTICE OF MEDICINE AS A PROBLEM IN INDUSTRIAL HYGIENE. *R. Fitz. Jour. Am. Med. Assn., Aug. 15, 1931, vol. 97, pp. 443-445.*

The physician's professional life exposes him to certain health hazards that are dangerous to life and also uncomfortable and expensive to bear, yet little has been done to analyze the nature and importance of these hazards or to offer suggestions as to how to avoid them. The commonest causes of death among the younger age groups are infection and trauma; among the older groups, cancer and vascular disease. All medical schools owe their students a sound medical education, and also adequate housing facilities and health supervision. Similarly, all hospitals owe their resident staff not only the best possible facilities for carrying on medical work but also equally perfect equipment in the way of living quarters, good food, and opportunities for rest and recreation. It is the author's opinion that the hygiene of the profession can best be improved by fulfilment of these obligations by medical schools and hospitals.

SOCIAL HYGIENE IN THE BADEN BRUSH INDUSTRY *A. Brandt. Schrift. a. d. Gesamtgeb. d. Gewerbehyg., no. 27, 1930, pp. 59.*

In the home industry conditions are extremely bad, owing to the low standard of living prevailing among the workers. The work itself is not re-

sponsible for any injury to health. In small and medium-sized plants neither the sanitary nor the safety requirements are fulfilled. The large industries, however, in general provide well for the health of the workers, but further protection against anthrax is necessary. Few accidents or diseases peculiar to the industry occur. The general hygiene of the larger plants is on a higher level than that of the smaller plants and the home industry, chiefly because the economic condition of the workers is better.

HEALTH CONDITIONS IN TANYARDS. *Koelsch and Lederer. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 169-198, in Bull. Hyg., Dec., 1931, vol. 6, p. 867.*

The authors examined 1,000 workers (908 men and 92 women) in thirty-two Bavarian tanneries for sole leather, glacé kid, including one where buffalo hides only were treated and one solely engaged in chrome tanning. The workers were classified according to age, duration of employment, and physical development (57.9 per cent. strong, 36.7 medium, and 5.4 weak).

Rheumatic affections were especially prominent among those working in wet processes (18.56 per cent. complaining in the heavy leather section); next came illnesses due to chills and gastric troubles. Abrasions and skin cracks were very common. Anthrax was a risk but a small one. Skin lesions and eczema were noted from use of sodium sulphide in dehairing and from chrome in chrome tanning. They discuss whether rheumatic affections can be regarded as so specific to the occupation as to be added to the list of scheduled diseases brought under the German Accident Insurance Act by the Order of May 12, 1925, but they dismiss the suggestion except, perhaps, in the case of chronic deforming inflammation of the joints. This they regard as comparatively rare, as incapacitating, as capable of being shown to be clinically specific by radiography, and as reducing the sufferer to a state of misery.

A table is given of the cases of anthrax in Germany for the twenty years from 1910 to 1929. They numbered 707 (87 fatal) of which 11 were internal (all fatal) and 696 (76 fatal) external. Head and neck were the site in 467 (56 fatal), the trunk in 15 (2 fatal), the arm in 195 (10 fatal), the leg in 16 (none fatal), while in three the site was not stated. Foreign hides and skins accounted for 28, or 3.97 per cent.; in 94, or 13.29 per cent., the origin was doubtful. Infection from dry hides occurred in 586, or 82.88 per cent. The liming process, they consider, seems to reduce the number of living anthrax spores in three days by about 90 per cent. Cases after liming are infrequent.—T. M. L.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

TRAUMATIC INDUSTRIAL CANCER. *I. I. Kaplan. Abstr. as follows from Ann. Surg., Aug., 1931, vol. 94, p. 213, in Arch. Dermat. and Syph., Jan., 1932, vol. 25, p. 142.*

In reviewing the incidence of industrial causes in cases of cancer studied in the division of cancer, department of hospitals, city of New York, the author feels that those due to the

action of X-rays are the only ones that can be definitely attributed to occupation. For the most part, the essay is composed of a group of brief case records and speculative consideration as to the relation of the malignancy and the occupational factors in each, the latter consisting in most instances of direct trauma of various types to the sites of subsequent malignant degeneration. The views of others, notably Ewing, Knox and Mock and Ellis, on the subject of the relation of trauma and malignancy are quoted.

THE OCCUPATIONAL INCIDENCE OF CANCER. *F. L. Hoffman. Contributed to the International Occupational Disease Conference, Geneva, 1931, pp. 23. Abstr. in Bull. Hyg., Dec., 1931, vol. 6, p. 890.*

A review is given of the literature on occupational cancers. The author has tabulated deaths from cancer of the male genital organs in 1926 to 1929 in the United States registration area for twenty-three specific occupations. Of the total deaths from cancer of the scrotum 6 per cent. are recorded among textile workers as against only 0.7 per cent. of deaths from cancer of the penis. In commercial and clerical workers the proportions are: cancer of the penis 7.1 per cent., cancer of the scrotum 14.3 per cent. For both types of cancer the proportion for married men was 85 per cent. The death rate per million for cancer of the penis was 6.1 for married and 1.9 for single men. Both forms of cancer appear to be more common in the colored than in the white population.

In connection with the San Francisco cancer survey the author has tabulated deaths from cancer among males by site and occupation for 1920 to 1927. There were 3,462 deaths from cancer and in each of the occupations studied the largest number of deaths was due to cancer of the stomach.—H. M. W.

THE PREVENTION OF INJURY TO HEALTH FROM "POUNDING UP" MACHINES. CARRIED OUT AT THE REQUEST OF THE TECHNICAL SECTION OF THE GERMAN ASSOCIATION OF INDUSTRIAL HYGIENE. *H. Gerbis, A. Gros, F. K. Meyer-Brodnitz, and J. Robinson. Abstr. from Schrift. a. d. Gesamtgeb. d. Gewerbehyg., no. 35, 1931, pp. 35, in Bull. Hyg., Dec., 1931, vol. 6, p. 867.*

The importance of the subject of the disability and discomfort caused by "dead fingers" among pounders up in the boot and shoe industry is shown by the collaboration of four experts, including two medical men, an engineer, and a representative of the trade in the production of this study. Illustrations show what the pounding up machines have to do and the way in which it is done, ending finally with an automatic pounding up machine which must eventually be the solution of the trouble.

The neurosis of the angiocapillary vessels in the severest cases leads to marked limitation of earning capacity, as the hands become almost useless. These severe cases come under the scheduled condition for compensation by the Order of May 12, 1925, which brought specified diseases under the German Accident Insurance Act. The authors say that the malady is easily recognized by the blueness of the skin of the fingers and the Raynaud condition at once produced by washing under tap

water for two or three minutes. Until automatic machinery has been adopted, they suggest as a palliative that four or five hours daily is as much as anyone should work on these machines where the blows on the shoe amount to 36,000 per minute.—T. M. L.

VACCINE IN THE PREVENTION OF THE COMMON COLD. AN EXPERIMENT. *W. E. Brown. Am. Jour. Hyg., Jan., 1932, vol. 15, pp. 36-63.*

An experimental study was made to determine the effects of vaccination on the incidence and duration of common colds. Eighty medical students were vaccinated with a prepared, partially detoxicated vaccine and eighty-two medical students acted as controls.

The statistical results of the experiment show little, if any, improvement with regard to common colds in the experimental group as a whole compared with the control group. Individuals in the experimental group appear to have received some benefit. This is in accord with the findings that the group as a whole was not completely desensitized to the particular antigens used. Better results may be possible with an increased dosage of the vaccine or by employing with each individual the particular antigens to which he may be shown sensitive.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

ON THE MANNER IN WHICH POISONOUS GASES AND FUMES EXERT THEIR EFFECT. *F. Gaisböck. Abstr. as follows from Wien. klin. Wchnschr., 1931, vol. 44, pp. 937-939, in Bull. Hyg., Dec., 1931, vol. 6, p. 866.*

The author lays stress on the increased danger when mixtures of gases and fumes are present, as occurs in exhaust gases from internal combustion engines, fires, and explosives used in mines. Thus mixtures of nitrous fumes and carbon monoxide developed from mine explosives, or in the burning of X-ray films (citing here the Cleveland disaster), have been shown experimentally to prove fatal when the amount of each gas or fume inhaled singly will produce only slight symptoms. He cites Wirth as stating that in experiments lasting ninety minutes, inhalation of about half the mixture of the two gases proved fatal and in a much shorter time than it would have with either gas singly.—T. M. L.

LIST OF PERMISSIBLE SELF-CONTAINED OXYGEN BREATHING APPARATUS, GAS MASKS, AND HOSE MASKS. *U. S. Bur. Mines, Information Circ. No. 6494, Sept., 1931, pp. 3 (mimeographed).*

BENZOL. *Health Practices Pamphlet No. 14, Nat. Safety Council, 1931, pp. 7.*

This pamphlet describes the principles used in protecting the health of workers exposed to benzene.

INCREASED TENDENCY TO THROMBUS FORMATION DUE TO CHRONIC POISONING BY EXHAUST GASES FROM AUTOMOBILES. *H. Kuntzen. Abstr. as follows from Deutsch. med. Wchnschr., July 31, 1931, vol. 57, pp. 1319-1321, in Bull. Hyg., Dec., 1931, vol. 6, p. 866.*

Struck by the increase in cases of thrombosis and embolism of late years in all civilized countries [no figures are given in substantiation of the statement] the author, considering that contamination of the air, in cities

especially, from exhaust gases of internal combustion engines was a recent phenomenon, carried out experiments to see whether this offered an explanation.

Rats and rabbits were exposed during a period of two and a half months for about half an hour daily to exhaust gases. After this length of exposure 3 to 4 drops of varicopthin were injected into the portal vein. Of fifteen rats so treated four died within from twenty-four to forty-eight hours—three of them showing advanced thrombosis extending to the finer mesenteric vessels. Of ten treated in a similar manner as controls, none died.

The author considers that his experiments show that the blood had acquired properties tending to predispose it to thrombosis.—T. M. L.

THE DETERMINATION OF CARBON MONOXIDE PRODUCED FROM PAINTED SURFACES IN CONFINED SPACES. *F. H. Newington. Abstr. as follows from Jour. Soc. Chem. Indust., Oct. 2, 1931, vol. 50, pp. 371-375T, in Chem. Abstr., Jan. 20, 1932, vol. 26, p. 607.*

The drying of both raw and boiled linseed oil, as well as iron oxide paint containing linseed oil, in confined spaces is accompanied by the production of small quantities of carbon monoxide, together with a large deficiency of oxygen. With drying paint, the carbon monoxide in the atmosphere may reach 0.3 to 0.4 per cent., approaching a dangerous concentration. The apparatus and method for the analysis of the atmosphere of ships' compartments are described, the carbon monoxide being determined by reaction with iodine pentoxide and titration of the iodine liberated.—P. D.

COPPER POISONING. *W. Kröner. Zentralbl. f. Gewerbehyg., May, 1931, N. S. vol. 8, pp. 120-121.*

Inhalation of air into which a solution of 0.06 per cent. to 0.1 per cent. of copper as hydroxide dissolved in 0.1 to 0.2 per cent. ammonia was sprayed, produced symptoms characterized by headache, difficulty in breathing, and a pain in the chest. A sensation of metallic taste persisted for some time. Owing to its low concentration, none of the effects may be ascribed to the ammonia.—L. T. F.

ROENTGENOLOGIC DIAGNOSIS OF LEAD POISONING IN INFANTS AND CHILDREN. *E. C. Vogt. Jour. Am. Med. Assn., Jan. 9, 1932, vol. 98, pp. 125-128.*

1. Lead poisoning in children is more common than generally suspected and may be the cause of obscure neurologic and gastro-intestinal complaints.

2. The chief source of lead affecting the health of infants and children is paint chewed from furniture, woodwork, and toys. Other sources are water pipes, nipple shields, and household utensils.

3. When absorbed into the body, lead is stored in the bones and can be detected on the roentgenogram as a dense band at the growing margins. Its elimination can also be followed.

4. The roentgenologic signs are very constant but not specific and therefore confirmatory evidence is necessary.—*Author's Summary.*

STIPPLED CELLS AND INDUSTRIAL LEAD POISONING. *H. Lehmann. Zentralbl. f. Gewerbehyg., May, 1931, N. S. vol. 8, pp. 121-122.*

The author cites evidence to show that granular basophilic erythrocytes

may be demonstrated in workers in other industries than that of lead—notably in cement and porcelain workers.—L. T. F.

I. Pathology of Metabolism Following Lead Poisoning of the Organism: Nitrogen Metabolism of Carnivora in Chronic Lead Poisoning. *A. M. Tscharny. Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 11–41.*

II. *Idem:* Alkali Reserve of the Blood in Chronic Lead Poisoning. *A. M. Tscharny. Ibid., pp. 42–46.*

III. *Idem:* Blood Phosphorus in Chronic Lead Poisoning. *A. M. Tscharny. Ibid., pp. 47–55.*

IV. *Idem:* Influence of Hydrochloric Acid on Phosphorus and Calcium Output in Chronic Lead Poisoning. *A. M. Tscharny and E. Israilewitsch. Ibid., pp. 56–70.*

Abstracted in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Nov. 18, 1931, vol. 62, pp. 654–656.

I. Cats and dogs were brought to nitrogen equilibrium and then poisoned with lead. The nitrogen partition in urine and feces was determined. A distinct disturbance of nitrogen equilibrium follows lead poisoning. The excretion of total nitrogen is decreased and specifically the creatinine, urea, and ammonia content of the urine decreased.

II. In four lead poisoned dogs the blood alkali reserve and the hydrogen ion concentration of the urine were determined. In the first period of the experiment there was a distinct lowering in alkali reserve followed in a later period by increased alkali reserve due to overcompensation.

III. (1) Inorganic blood phosphorus increases during the entire course of poisoning. (2) The acid soluble phosphorus is decreased. (3) The lipoid phosphorus rises somewhat. (4) The phosphate content of the urine is diminished, parallel with the decrease in amount of total urine.

IV. Dogs poisoned with white lead have an increased output of calcium in urine and feces, while the inorganic phosphorus of the blood is increased at first following hydrochloric acid feeding and then shows a distinct change. The acid soluble phosphorus is at first decreased and later increases. —L. T. F.

Potassium and Calcium Metabolism in Lead Poisoning. *L. Maschbitz and F. Urjewa. Abstr. as follows from Ztschr. f. d. ges. exper. Med., 1931, vol. 75, p. 590, in Physiol. Abstr., Dec., 1931, vol. 16, pp. 571–572.*

Rabbits were taken (sex, age, weight, etc., as similar as possible) and given a constant diet which assured complete consumption and gradual gain in weight (40 gm. cabbage, 40 gm. oats, and 60 gm. carrots). Urine and feces were collected during several weeks before administration of lead, and excretion of potassium and calcium determined. After this preliminary period lead acetate was given in doses varying between 8 and 100 mg. per day. The variations in excretions were so great that authors found difficulty in interpreting findings after lead. The principal change induced by the lead poisoning was a complete disorganization of the distribution of potassium and calcium between urine and feces. The amounts of potassium in the feces were in some cases enormously increased. The authors con-

clude that the lead poisoning produced a disturbance in assimilation of electrolytes.

ESTIMATION OF SMALL QUANTITIES OF MERCURY IN AIR. *E. V. Alekseevskiĭ. Abstr. as follows from Zhur. Prikladnoĭ Khim., 1931, vol. 4, pp. 411-414, in Chem. Abstr., Jan. 20, 1932, vol. 26, p. 395.*

The absorption of mercury vapors in chlorine water followed by precipitating mercury with copper and its microcolorimetric determination gives very accurate results if necessary precautions are observed.—P. D.

POISONING BY MERCURY VAPORS AND COMPOUNDS, AND THE SYMPTOMATOLOGIC AND PHYSICOPATHOLOGIC DIFFERENCES. *C. Biondi. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 1, pp. 754-762; Chim. et indust., 1931, vol. 25, p. 1403, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 214.*

The less severe forms of mercury poisoning are now known to be due to the action of mercury vapor and the other acute forms are produced by ionizable mercury salts. There are, however, more complex cases in which both classes of symptoms are encountered. Even at the present time there is no satisfactory explanation of the physiologic action of mercury, the lesions produced by mercury diethyl being probably attributable to the ethyl radical. According to the experiments of Biondi on man and on rabbits, the initial symptoms of intoxication by mercury vapor appear very rapidly, but can also disappear very rapidly. It is possible that the inhaled mercury vapors are fixed by the organism as a compound which passes into the blood stream and then acts on the central nervous system.—P. D.

EXTENSOR WEAKNESS IN WORKERS WITH MERCURY. *B. B. Koiransky and E. J. Benediktova. Zentralbl. f. Gewerbehyg., July, 1931, N. S. vol. 8, pp. 169-173.*

Weakness of the extensors of the right hand (of the left hand in left-handed persons) was found in 39.1 per cent. of a group of 133 workers with mercury—three or four times as often as in non-mercury workers. The degree of weakness is about the same as in lead workers. This symptom was found to occur after a few months of work, increasing in frequency with length of employment. In some cases it appeared independent of other symptoms of mercury poisoning.

CASES OF POISONING FROM A PAINT —INERTOL. *E. Rosenthal-Deussen. Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 92-98.*

INDUSTRIAL AND MEDICAL EXPERIENCES OF THE PAINT "INERTOL 49." *A. Stocké. Ibid., pp. 99-104.*

Abstracted as follows in Bull. Hyg., Dec., 1931, vol. 6, pp. 868-869.

These two papers deal with a coating medium sold under the fancy name of "Inertol," which has very extensive use in Germany as a protective covering against water and is hence used for painting the inside of reservoirs and water pipes, and for the prevention of iron rusting. On the drums a notice states that "sufficient ventilation is indispensable." It is not stated, however, that Inertol consists of 35 per cent. benzene and its homologues, principally xylene. In the instance under

review a reservoir to hold 4,400 cu. m. of water was being painted and in all 650 kg. of Inertol were used. As it effects its purpose better when the surface is dry, ventilation was kept as low as possible since the weather was damp. Out of twenty workers employed for one to six days, nineteen were affected with one or other of the symptoms of loss of appetite, vomiting, giddiness, headache, irritation of the eyes, and thirteen passed coffee-colored urine.

Probably no attention would have been called to these cases had not one of them died. This man had suffered from diabetes and from some abdominal complaint, and after becoming ill from inhaling the fumes he was taken to a hospital and there had his appendix removed. The medical referee took the view that his death was unconnected with the work which he had done. This the authors strongly oppose in view of his symptoms, which were similar to those described not only in his case but in many of the others.

Dr. Stocké points out how similar these symptoms are to those of the acute poisoning he had himself described from the use of xylene and toluene in processes of lithographic printing (*Zentralbl. f. Gewerbehyg.*, Dec., 1929, N. S. vol. 6, p. 355). The symptoms not described by him are the coffee-colored urine and strangury. Inhalation of concentrated Inertol fumes brings out the narcotic properties of xylene and toluene, and he believes that severe, even fatal illness from the use of Inertol has occurred in all parts of Germany and that greater safety would result from the publication of the precise composition of the preparation instead of the fancy name. In the particular instance referred to, respirators against dust were distributed but not such as would protect against gases and fumes.—T. M. L.

COMPOUNDING MATERIALS USED IN THE RUBBER INDUSTRY. PART 1—ACCELERATORS, ANTI-OXIDANTS, AND DRY ORGANIC COMPOUNDS. *Indust. Safety Series No. Ru. 1, Nat. Safety Council, 1931, pp. 16.*

This is the first pamphlet in a series dealing with rubber manufacture, giving a classification and description of the nature of the various compounds used. The material has been condensed but is complete enough to show the chemical nature of the compounds and the care with which they should be handled to prevent impairment to health.

A CONTRIBUTION TO THE INDUSTRIAL AND PATHOLOGIC SIGNIFICANCE OF TETRACHLORETHANE. *F. Zollinger. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 298-325, in Bull. Hyg., Dec., 1931, vol. 6, pp. 867-868.*

The author gives full details of the symptoms and postmortem findings of three fatal cases in two young women and a man employed in a small shoe factory. The symptoms were common to them all, commencing with a feeling of exhaustion, gastric disturbance, and abdominal pain, quickly followed by jaundice with coma as the terminal symptom. Typical acute yellow atrophy of the liver was found. Three further nonfatal cases in men in the same works are detailed. All had been employed in sticking the linen and paper coverings to the leather sole and uppers, placing them afterwards on a shelf above. Near the table on which eight girls worked was a drying stove and

above this a fan had been installed a short time before illness showed itself. The sticky material called "Resistin" was said to contain alcohol 6 parts, benzene 4, tetrachlorethane 14, and acetate of cellulose 3. None of the cases was correctly diagnosed by the medical attendant.

The author reviews the many cases of poisoning which have been described since the introduction of tetrachlorethane in 1903 as a solvent for fats and resins, claiming its noninflammability and slight solubility in water as an advantage over other solvents. In addition to numerous cases from doping of airplane wings (leading ultimately in 1917 to its exclusion from the dope), he cites fatal cases from the manufacture of artificial pearls and from its presence in zapon lacquers. He describes its increasing use as a solvent, as a cleaning agent, as a head wash, as a parasiticide, in the artificial silk and the boot and shoe industries, and as an ingredient in all manner of cleaning agents sold in tubes under trade names. —T. M. L.

EXPERIMENTAL CONTRIBUTION TO POISONING BY TETRACHLORETHANE. *L. Müller. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 326-329, in Bull. Hyg., Dec., 1931, vol. 6, p. 868.*

In experiments on white mice, guinea-pigs, and rabbits by inhalation, subcutaneous and intravenous injection, the author was able to note only fatty degeneration of the lobes of the liver, but not acute atrophy or the regenerative processes observed in man. This may be due, he thinks, to the same causes as have prevented, hitherto, experimental production of cirrhosis of the liver in animals.—T. M. L.

INVESTIGATION OF INJURIES FROM HARMFUL EFFECTS OF XYLENE IN BERLIN LITHOGRAPHIC PROCESSES. *L. Nelken. Abstr. as follows from Zentralbl. f. Gewerbehyg., July, 1931, N.S. vol. 8, pp. 182-184, in Bull. Hyg., Dec., 1931, vol. 6, p. 863.*

As a result of observations as to the harmful effects of xylene published by Dr. Stocké in the *Zentralblatt für Gewerbehygiene und Unfallverhütung* of December, 1929, the laboratory of the Sickness Insurance Society for Letter Press Printing issued a questionnaire and carried out determinations of the hemoglobin and the number of leukocytes in 220 persons.

The number of leukocytes was less than 5,800 in 13.64 per cent., under 5,500 in 8.18 per cent., and under 5,000 in 3.63 per cent. The hemoglobin was below 80 per cent. in 16.35 per cent. of those tested.

The general conclusion is that xylene poisoning (with possible toluene and benzene admixture) is caused in the processes where it is used in spite of the almost invariable application of local exhaust ventilation, and the changes can be shown in the blood picture.—T. M. L.

DUST HAZARDS AND THEIR EFFECTS

INDUSTRIAL DUST AND PULMONARY TUBERCULOSIS. *K. W. Jötten. Forsch. u. Fortschr., Nov. 20, 1931.*

During the last eight years the author has studied the effects of industrial dusts on rabbits which had been previously infected with tuberculosis from a human source, and he has been able

to show the different effects individual dusts have on the lung tissues. The rabbits were placed in a special inhalation chamber, into which the dust was introduced from below. The dust was thoroughly mixed with air by passing an intermittent air current through a series of three glass cylinders, the dust being put in the first. The dust concentration was generally from 60 to 80 mg. per cubic meter of air. Inhalations lasting from one-half to one hour a day were continued for three and one-half to five months; then the animals were killed and the lungs examined both macroscopically and microscopically. The results are arranged in three series: (1) the effects of dust from steel grinding, and from porcelain, coal, chalk, and soot; (2) the effects from cement, tobacco, and schist dusts; and (3) the effects from limestone, quartz, basic slag, white lead, and cotton textile dusts.

The greatest development of pulmonary tuberculosis was caused by the dust from grinding steel, and the next from porcelain and schist dusts, all of which contain much free silica. In spite of its high content of silica, quartz was found essentially harmless. Basic slag, coal, soot, and limestone were only slightly injurious. Cement, textile, and tobacco dusts were almost noninjurious, and the same may be said for white lead dust and chalk dust ($Ca(OH)_2$), the latter of which might almost be regarded as a therapeutic agent. These results agree generally with statistics of diseases, and where variations occur they can be explained by special circumstances, such as careful vocational selection, the employment of many juveniles, and home work under bad housing conditions. A high rate of pulmonary tuberculosis had been expected from the quartz dust, owing to the high content of free silica and therefore its harmlessness came as a surprise. It seems, however, that Smith and Collis have previously shown that this harmlessness may be due to a considerable admixture with aluminium oxide, and Heffernan has shown the same among quartz workers in Derbyshire. The failure of white lead dust to produce pulmonary tuberculosis was due to the great solubility of this dust in the lung tissues.—A. J. C.

PULMONARY ASBESTOSIS. *E. Beintker. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 345-358, in Bull. Hyg., Dec., 1931, vol. 6, pp. 862-863.*

The author records two cases, with postmortem examination, of pulmonary asbestosis occurring in a factory concerned with the crushing, cleansing, and spinning of asbestos and the manufacture of insulation materials.

The first had been exposed to asbestos dust from 1902 to 1922, and from 1922, when symptoms first appeared, until his death in 1929 as a porter. On X-ray examination the heart shadow was increased in diameter and the lung roots showed enlargement. The lung fields showed diffuse shadowing with small nodules about the size of a millet seed. These appearances were on the whole most marked in the left lower lobe. The patient died of heart failure. Histologic examination of the lung showed increase in connective tissue and extensive inflammation of the lung, together with asbestosis bodies.

The exposure in the second case began in 1900. There was a long period of dyspnea and the patient finally died of heart failure. The X-ray appearances were chiefly confined to the lower lobes.

In discussing the formation of the asbestosis bodies, the author is in

agreement with the general opinion that they are formed from the asbestos fiber *in situ* in the body tissues, probably as the result of a biochemical action with silica contained in the raw material. He attributes the diffuse character of the X-ray shadowing to the fact that the asbestos fibers penetrate impartially throughout the lung tissue and are not aggregated together as they are in the other forms of silicosis. He believes that the asbestos loses its magnesium portion in the tissues and that pure silica remains, which stimulates the formation of connective tissue.

In conclusion, the author notes that asbestosis of the lung differs from silicosis in its radiologic picture as well as in anatomic findings, in that the connective tissue increase is very diffusely distributed. It is arranged in nodules in silicosis, whereas in asbestosis it is distributed diffusely throughout the lung. The actual morbid anatomy picture appears to depend upon the distribution of the asbestos fibers in the lung tissue, and it is assumed that the asbestos fibers which gain access to the tissues probably do not begin their development into bodies until they reach the tissues. They are apparently the accumulation of the silica containing material. The author believes that the X-ray picture in all types of silicosis, including asbestosis, depends not so much on the quantity of the thickened tissues as on its distribution in the lung. Diffuse distribution does not give the same intensity of shadow to the radiologic picture as does the nodular distribution. He suggests that the fibrosis of the lung tissue develops, in asbestosis, through the breaking down of the material of the asbestos fibers into silica.—S. R. G.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

DISCUSSION ON THE PRESENT-DAY POSITION OF PNEUMONIA ON THE MINES. *A. Smith, F. Daubenton, P. A. Peall, L. I. Coleman, and H. Q. F. Thompson. Abstr. as follows from Jour. Med. Assn. So. Africa, 1931, vol. 5, pp. 389-396, in Bull. Hyg., Nov., 1931, vol. 6, p. 807.*

This is a report of a meeting held at Johannesburg in May, 1931. Dr. A. Smith, who read the first paper, said that since 1923 pneumonia had steadily increased despite the use of Lister's pneumonia vaccine. Since 1928 the prophylactic vaccination of new recruits had been given up at most of the mines, as it was considered that a new type of pneumococcus had developed, and its discontinuance did not seem to have any ill effect. In 1930 the number of cases increased owing, it was believed, to the increase in the new laborers taken on that year, and to the occurrence of influenza in overcrowded quarters. While the mortality from other causes had decreased of recent years, mortality from pneumonia had increased.

Dr. Daubenton called attention to the incidence rate of 3 per cent. for the Rand and 1 per cent. in other countries, and the case mortality of 11 per cent. on the Rand compared with over 20 per cent. in Britain and between 30 and 40 per cent. in the United States. There were a number of cases resembling lobar pneumonia which cleared up in from two to three days. These he

did not return as pneumonia although other medical officers often did. Only true lobar pneumonia due to the pneumococcus should be included in the statistics. Owing to difficulty of diagnosis, the tendency is to include all inflammatory conditions of the lung in the pneumonia group.

Dr. P. A. Peall had not found any instance of more than one case from the same room and gang, and considered that the problem of prevention lay in building up the resistance of each man rather than in attempts to prevent the spread of infection. At one mine the experiment had been made of including Soya flour in the bread and mealie meal porridge with the result that there was a reduction in the sickness incidence; the experiment is being continued. By the prophylactic use of an autogenous vaccine he had found a very decided decrease in pneumonia mortality.—A. J. C.

TUBERCULOSIS AMONG NURSES. *E. K. Geer. Arch. Int. Med., Jan., 1932, vol. 49, pp. 77-87.*

1. Thirty per cent. of the nurses entering Ancker Hospital Training School show positive reactions to the intradermal tuberculin test.

2. Practically all nurses at Ancker Hospital show a positive cutaneous reaction to tuberculin before completing training.

3. Nurses in five other general hospitals in St. Paul reveal an average of 42 per cent. reacting positively to tuberculin given intradermally in their last year of training.

4. In six of 110 nurses, or 5.5 per cent., entering Ancker Hospital in the past two years tuberculous disease has developed; five of them gave negative reactions on entering training and three of them had pleurisy with effusion.

5. Tuberculosis sanatoriums and tuberculosis departments of general hospitals should employ rigid contagious technic, especially in those communities in which the incidence of tuberculous infection among young adults is low.

6. All patients entering all hospitals should have a roentgenogram of the chest made as a routine procedure.

7. All sputums should be sent to the laboratory by nurses.

8. It is hoped that studies similar to this one, with the inclusion of medical students, internes, and other hospital employees, will be undertaken in other institutions.—*Author's Conclusions.*

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

ECZEMA, ESPECIALLY INDUSTRIAL ECZEMA, WITH THE CAPILLARY MICROSCOPE. *M. Michael and C. Radeff. Abstr. as follows from Dermat. Ztschr., June, 1931, vol. 61, p. 159, in Arch. Dermat. and Syph., Feb., 1932, vol. 25, p. 384.*

The authors found approximately the same percentage of abnormal capillary forms in patients with eczema as in noneczematous patients. They studied these changes in the uninvolved areas of the skin. The number of abnormal forms was considerably higher among males than among females.

OCCUPATIONAL ALLERGIC DISEASES OF THE SKIN. *M. Michael. Klin. Wchnschr., Nov. 21, 1931, vol. 10, p. 2180; Nov. 28, 1931, p. 2223.*

BRUCELLA ERUPTION AMONG VETERINARY SURGEONS: AN OCCUPATIONAL CONDITION OF THE SKIN PROBABLY ALLERGIC IN NATURE CAUSED BY THE BACILLUS ABORTUS BANG. *H. Haxthausen and A. Thomsen. Abstr. as follows from Arch. f. Dermat. u. Syph., July 23, 1931, vol. 163, p. 477, in Arch. Dermat. and Syph., Feb., 1932, vol. 25, p. 379.*

The authors describe a skin disease that has affected about 30 per cent. of the veterinary surgeons in Denmark. It is characterized by the appearance on the upper extremities of follicular papules, accompanied by pustules and necrosis. The eruption appears soon after the handling of afterbirths of cows infected with Bacillus abortus Bang, and has a tendency to recur after each exposure. Because of negative cultural experiments with exudate from the lesions and because of positive intradermal reactions with an extract of the bacillus, a so-called "abortin," the authors consider the eruption to be allergic.

CHROME ECZEMA IN PHOTOGRAPHIC AND LITHOGRAPHIC PROCESSES. *W. E. Engelhardt and R. L. Mayer. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 140-168, in Bull. Hyg., Dec., 1931, vol. 6, pp. 863-864.*

This study from the laboratory of industrial hygiene of the Imperial Health Office, Berlin, and the University Skin Clinic, Breslau, covers a wide field. A technical section describes the industrial use of chrome compounds in (*a*) the graphic arts (mainly potassium and ammonium bichromates in combination with organic substances such as albumin, fish lime, gelatin, and gum), mentioning also its further use in (*b*) chrome tanning, (*c*) furniture polishing, (*d*) the chemical industry, (*e*) the textile industry as a mordanting agent, (*f*) fur dyeing, (*g*) electrotechnical processes (chromium plating), and (*h*) recently as a rust preventer in oils containing bichromates.

Details are given (with illustrations) of how chromium is used in photographic reproduction, and how the operator comes into contact with chrome salts. The extensive literature on the subject is then surveyed. In their inquiry the authors examined 114 persons; of these, nineteen were found at the examination to be suffering from eczema, while eleven, soon after commencing work, had so suffered. Thus in all, thirty, or 26 per cent., were affected —*i.e.*, every fourth person after commencing work had suffered from eczema. Examination of a shift of thirty-five men in a factory where bichromates were manufactured revealed no case of eczema, but, on the other hand, twenty-nine showed perforation of the septum of the nose and twenty-seven had suffered from chrome holes. The authors draw great distinction between these two varieties of lesions set up by chrome compounds.

All the 114 persons were tested with a 0.5 per cent. bichromate solution as to their sensibility to chrome compounds. Of the nineteen showing existent effects, 84 per cent. reacted; of the eleven who had survived early attacks, 64 per cent.; and of the eighty-four who had never suffered, only 8.5 per cent. They consider, therefore, that at least 74 per cent. of sufferers from chrome eczema have a specific hypersensitiveness to the chemical, partly inherent and partly acquired

as a result of contact. The condition, in their opinion, should be added to the list of skin maladies under the Order of May 12, 1925, which brought specified diseases under the German Accident Insurance Act.

Stress is laid on protection by the wearing of rubber gloves reaching high up on the forearms, proper washing, and, above all, frequent use of bisulphite of soda solution to reduce the injurious action of the compounds.—T. M. L.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

CLINICAL ASPECTS OF CHRONIC FATIGUE IN WORKING WOMEN. *V. M. Palmieri. Abstr. as follows from Méd. du travail, July, 1931, vol. 3, pp. 93–112, in Bull. Hyg., Dec., 1931, vol. 6, pp. 859–860.*

The whole question of industrial fatigue is reviewed at some length. The claim is advanced that while healthy activity stimulates metabolism, increasing tone and acidity, multiplying leukocytes, deepening breathing, and assisting digestive processes, too much activity engenders fatigue with faulty metabolism, lessened tone, alkalinity, anemia, irritability, digestive worries, and, among women, menstrual disturbances. Observations on thirty-seven working women with symptoms of overwork demonstrated that no treatment, except rest, was needed to restore them to normal health. The influence of chronic fatigue on the various systems of the body is set forth; but no new facts are advanced in support of the views presented. The blood picture of chronic fatigue is given as diminished hemoglobin, normoblasts present, leukopenia, hyponucleosis, and lowered phagocytic power. Sexual disturbances are also said to result, with diminution in the activity of the germ plasm. [The fact that fertility is highest among those who perform most physical labor is against this last contention.]—E. L. C.

PHYSIOLOGY AND PATHOLOGY OF FATIGUE. *A. P. Goldberg, M. W. Lepskaja, and M. S. Michlin. Ztschr. f. d. ges. exper. Med., Oct. 20, 1931, vol. 79, p. 188.*

THE PHYSIOLOGY AND PATHOLOGY OF FATIGUE. V. CHANGES IN THE METABOLISM AND HISTOLOGIC STRUCTURE OF ORGANS AND TISSUES OF DOGS AND RABBITS IN CONNECTION WITH THE DIFFERENT RESISTANCES OF THEIR ORGANISMS WITH "ACUTE" AND "CHRONIC" FATIGUE. *A. P. Goldberg, M. W. Lepskaja, M. S. Michlin, and D. I. Galperin. Abstr. as follows from Ztschr. f. d. ges. exper. Med., 1931, vol. 77, pp. 577–593, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 207.*

Acute fatigue of dogs is marked by regular changes in the intermediate metabolism both with regard to the blood and urine and with regard to the chemistry of the organs and tissues. There is an increase of potassium, inorganic phosphorus, and calcium in the serum and a shift in the acid-base balance. The intensity of the changes is greatest with a short training period and a high work tempo and least with a gradual increase in the output of work. With intensive work extensive changes are found in the carbohydrate metabolism while with a large output of work at a slower tempo the changes affect the nitrogen metabolism.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

FUNCTIONS OF AN INDUSTRIAL EYE CLINIC. *Metropolitan Life Insurance Co., Indust. Health Series No. 4, pp. 56.*

This booklet indicates the benefits resulting from correcting defective eyesight and suggests methods of supervising the visual condition of workers through industrial plant clinics. Several illustrated pages are devoted to a description of the technic of eye examinations, including a section on the types of color blindness and methods of detecting it. There are also chapters devoted to principles of illumination, lighting codes, and references on illumination.

PHYSICAL DEFECTS. *Health Practices Pamphlet No. 13, Nat. Safety Council, 1931, pp. 8.*

The points covered in this pamphlet are: definition and relationships of physical defects; general prevalence of physical defects in different groups; general influence of age; discussion of the more common physical defects; general influence of broad occupational groups; correction of physical defects; records; and a follow-up system, with a general discussion of follow-up methods.

PERSONNEL AND HEALTH WORK. *Health Practices Pamphlet No. 15, Nat. Safety Council, 1931, pp. 6.*

Emphasis is placed on some fundamental conceptions common to personnel and health programs in industry. "It is hoped that these ideas will form the basis and stimulus for further study of these important relationships, eventually leading to a better understanding and constructive coordination of the principles of personnel and health work."

INDUSTRIAL NURSING

THE NURSE'S PLACE IN INDUSTRIAL HEALTH. *W. A. Sawyer. Pub. Health Nurse, May, 1931, vol. 23, pp. 222–226.*

"Public health is in the way of being considered a public utility." Industrial concerns are learning that the organization of plant hospitals and efficient preventive measures save money by conserving the health of their employees.

A nurse before entering the industrial field should have at least a short period of private duty, dealing with those already sick. In public health work she is concerned in maintaining health. The requirements for a successful public health nurse include good health, a pleasant personality, emotional stability, and understanding; she must be able to influence the mental attitude of the patient as well as to note and advise treatment for physical disabilities.—A. M.

THE NURSE IN A SMALL PLANT. *W. A. Carver. Pub. Health Nurse, June, 1931, vol. 23, pp. 275–277.*

The nurse in a small industrial concern must realize the opportunities there. Her routine duties may include treatments prescribed by the doctor, preferably through written orders, a routine system of dental and physical examinations, appointments so made as

to conserve the time of the employee and the doctor, follow-up of treatment, and reexamination of medical defects. She must assist in overcoming fear of physical examinations, or of the possible loss of jobs because of physical defects. She should know the safety rules applicable to her plant and should be familiar with the state compensation laws, so that she can discuss hazards and suggest better safety regulations. By daily plant inspection she should note unsafe methods or poor sanitary conditions; she should supervise the cleanliness, prices, and dietetic standards of the lunch room. Recreational activities should be of interest to her. Plant policies, wage scales, bonus and insurance plans should be familiar to her. Through contacts with the families of the employees she may succeed in bettering home conditions and so improve the employees' value to the company.—A. M.

INDUSTRIAL PERSONAL AND COMMUNITY HYGIENE: HOUSING, ETC.

WORK ENVIRONMENT AS A FACTOR IN THE GENERAL HEALTH OF WORKERS. *B. J. Newman. Am. Jour. Pub. Health, Dec., 1931, vol. 21, pp. 1352-1359.*

The author believes that good judgment necessitates the inclusion of housing data in analyses of the hazards of industry, and, in the event that a causal relationship is found between environmental conditions and the diseases being studied, the findings should be emphasized so that plant managers will feel it incumbent upon them to develop a program adequate to meet the situation.

HOUSING CONDITIONS OF AGRICULTURAL WORKERS IN SWEDEN. *Abstr. as follows from Internat. Labour Rev., 1931, vol. 24, pp. 75-87, in Bull. Hyg., Dec., 1931, vol. 6, p. 899.*

One of the results of the 1921 session of the International Labour Conference was to stimulate two inquiries into the housing conditions of agricultural workers in Sweden, the first by the Swedish medical profession, and the second by the social board, working more or less in co-operation.

Health regulations of 1919 in Sweden apply to towns and countryside alike, but building regulations differ; every commune must have a special health council and consider the housing question. Standards are set up as to cubic space, warmth, ventilation, and protection from damp. Rooms unfit can be condemned, but compulsory inspection does not obtain in the rural areas.

The provincial authorities have stiffened the standards by advice to local communes. Rooms must not be constructed in stables or barns unless isolated and provided with a fireplace; oil stoves are discouraged. A single adult requires from 20 to 25 cu. m. Windows must be capable of being opened, and must be double in winter.

The National Agreement of 1925 makes stipulations for two rooms and a kitchen for a family, or one room and a kitchen of not less than 35 sq. m. Compensation for less accommodation must be allowed. Outhouses, etc., must be provided, including pigsty or

fowl run for those whose payment is partly in kind. There must be a garden.

The medical inquiry reveals that these standards are not observed generally. The housing conditions of nearly the whole rural population were examined. A "poverty line" of 300 kroner for adults was drawn, and the persons were also divided according to occupation, agricultural or industrial, making four groups in all. There were found to be 423 households well-to-do, and 469 poor, engaged in agriculture, while the figures for other workers were 613 and 276, respectively—1,781 households in all. More than half and about one-third were thus found to be below the poverty line in the two classes. The poor agricultural workers had distinctly more children than the other groups.

The minimum of two rooms and a kitchen was at the disposal of one-third of the well-to-do workers and of one-fifth of the poorer class. In regard to cubic space, the agricultural workers were better off than the others; the same holds good with regard to bedroom accommodation. The general conclusion was that four-fifths of the poorer and one-half of the well-to-do rural population lived in inadequate dwellings.

The social board's inquiry was directed to local authorities, and sought to discover how far the rural housing conditions had improved during the last ten years. The information gathered is mostly of an administrative and economic character, and presents a great variety of conditions. The main conclusion is that positive financial assistance or credit afforded to the rural population is necessary to render effective the attempts to establish a higher hygienic standard.—W. L. H.

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

Feeding Factory Workers. *E. Gotschlich, H. Gerbis, and K. Reutti. Beihefte z. Zentralbl. f. Gewerbehyg., no. 16, 1930, pp. 61.*

Each of these authors contributes a section of the report: Gotschlich, on the scientific principles of nutrition; Gerbis, on the medical problems connected with the provision of food for factory workers; and Reutti, on the management of factory lunch rooms. Gerbis believes that factory workers should have a hot meal in the middle of the day for the reason that hot food is more easily digested than cold food. They should also be encouraged to take a full hour's interval at noon, and this can be done by providing attractive dining and recreation rooms. In some factories where workers arrive too hungry to do a full morning's work efficiently, soup is provided for a small sum. Reutti considers the practical problems encountered in establishing factory lunch rooms and shows by illustrations the provisions made in various factories. Some interesting points were brought out in the discussion following these three articles.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

FIRST ALL-UNION CONFERENCE ON PROBLEMS OF MEDICAL EXPERT OPINIONS OF DISABILITY. *Papers and Resolutions. Narkomzdrav R.S.F.S.R. and Uk.S.S.R., 1928, pp. 196. Abstr. in Am. Jour. Ophth., Jan., 1932, vol. 15, pp. 68-70.*

The outstanding feature of interest in the papers and resolutions adopted at the first all-union conference on problems of medical expert opinion of disability held in 1928 is the almost unanimous rejection of the "percentage" system of determining loss of earning capacity as used by us and generally throughout Europe, in favor of the "group," also called the "rational" system. The group system is an attempt at classification of disabled individuals on the basis not only of functional loss sustained, but of occupation, age, and the general economic situation the individual has to face. The percentage system, borrowed from the West and introduced in 1921, when the New Economic Policy involving a new, hired status of labor was adopted, was dropped in 1925 for the group system. This system operates with six groups of permanently disabled workers.

Group 1 includes those totally disabled and helpless, necessitating some one to care for them, and is entitled to 100 per cent. of wages. Group 2 is composed of those disabled from following any occupation, but not helpless and receives so-called full pension, or two-thirds of wages. Group 3 comprises those capable of irregularly following their previous occupation with an allowance of 75 per cent. of full pension. Group 4 is of those disabled from following their previous occupation but capable of following a less remunerative occupation, and these get 50 per cent. of full pension. Group 5 is made up of those disabled from following their previous occupation but capable of rehabilitation for a new occupation, and gets 20 per cent. Group 6 is composed of those who have suffered a reduction of earning capacity at their normal occupation up to 15 per cent., and gets that amount. Social insurance covers not only industrial injuries and occupational disease but disability arising from any cause, and the problem of causal relation occupies a much more secondary position than it does with us. The mechanical conversion by equivalents of the percentage system into the group system led at first to absurdities, such as putting men who lost their left arm into the third group and those who lost a right arm into the second, because of a 10 per cent. difference in the old system. It seems obvious from the papers read at the conference that the group system is not foolproof, is more complicated, requires more skilled and longer trained medical experts to handle than the percentage system. There is a tendency noted to simplify it by reducing the groups to three, and incorporating the lower three groups into the third group of partially disabled.

The tables offered by Nathanson in his paper, "Some Problems in the Expert Examination of Eye Defects," are particularly elaborate. Not only is the group system followed, but a classification is attempted with ref-

erence to the six functions of the visual apparatus: visual acuity for distance, visual acuity for near, peripheral vision, binocular vision, color vision, and light sense. Each function is separately evaluated in accordance with occupation. Industrial blindness is regarded as beginning between 20/200 and 10/200, depending on the occupation. Similarly for industrial purposes 20/40 to 20/70 is regarded as normal vision. The loss of one eye is compensated for in terms of vision of the remaining eye, and as a loss of one-sixth of peripheral vision and of binocular vision, and is classified in the fourth, fifth, or sixth groups, depending on the occupation, and so forth. The worker has the right to refuse enucleation, and is compensated for sympathetic ophthalmia if it arises. Progressive myopia in people who work at close range is considered an occupational disease.

In dealing with traumatic neuroses Grinstein advocates as a prophylactic measure early return to industry, treatment in special sanatoriums, and small compensation when this fails, and in somatogenic postconcussion cerebrospinal syndromes, on the contrary, longer rest after injuries, and higher compensation in view of poor prognosis.

INDUSTRIAL DISABILITY VERSUS PAIN INTENSITY. *T. W. Edgar. Med. Jour. and Rec., Feb. 18, 1931, vol. 133, p. 157.*

The author believes that the subjective complaint of pain following injury should be carefully investigated before compensation is paid, and that settlement should be based on the intensity of pain. His procedure for determining intensity is outlined.

CONNECTION BETWEEN LEAD POISONING AND CARDIAC-ESOPHAGEAL SPASMS. *Floret. Zentralbl. f. Gewerbehyg., June, 1931, N.S. vol. 8, pp. 148-150.*

TUBERCULOSIS OF THE LUNGS AND DOUBTFUL LEAD POISONING. *Floret. Ibid., pp. 150-152; 152-154.*

Abstracted in Bull. Hyg., Dec., 1931, vol. 6, p. 865.

These are three judgments given in full by medical referees. In the first, a lead smelter aged 54, after exposure to lead fumes, had definitely suffered from lead poisoning from which at the time of his examination he had practically recovered except for slight weakness of one of his forearms. The esophageal spasms were considered by the referee to be of the same nature as lead colic and difficulty in swallowing therefore was attributable to the lead poisoning. The decisions in both cases of lead poisoning combined with tuberculosis were given against the appellants. In making the decisions reference is made to the opinion expressed in "Lead Poisoning and Lead Absorption" by Legge and Goadby:

> The distinction between causation and association has to be borne in mind before admitting as sequelae of lead poisoning diseases of bacterial origin, such as phthisis or pneumonia, or any disease to which the affected person may be thought to have been rendered more prone by reason of lead employment. The contention that a person may have been debilitated by lead poisoning is no proof that the enfeeblement of the constitution was the cause either of the bacillus gaining entrance into the lung or of the ultimate fatal issue from the engrafted disease. Such assertion in every case must rest on supposition. Evidence that lead

employment predisposes to phthisis is not necessarily made stronger, in our opinion, by existence during life of clinical symptoms, or, in their absence, of detection of lead in the tissues postmortem.

—T. M. L.

THE CLINICAL ASPECTS OF SILICOSIS. *C. L. Sutherland. Tubercle, 1931, vol. 13, pp. 110-114.*

The clinical side of silicosis is presented from the standpoint of compensation, with regard to which the author has unique experience. He points out that intensity of exposure is an important factor in determining both the age and the length of exposure of the victims of silicosis; acute cases have been recorded between 17 and 23 years of age, but the more normal age of occurrence in dusty industries is about 40 years. Diagnosis must depend to a great extent on radiologic examination, without which no case can be granted compensation in Great Britain. Fitness for work is an important element, which cannot be determined by classifying the cases on any clinical basis; sometimes a man in class 2 may be better able to work than one in class 1, and, indeed, may outlive him. The diagnosis of tuberculosis, when silicosis is present, is difficult; but some standard for determining the position of the case has to be adopted, since all cases of tuberculosis must be suspended from employment in any industry in which compensation for silicosis is awarded.—E. L. C.

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

RATES OF PHYSICAL IMPAIRMENTS IN 28 OCCUPATIONS, BASED ON 17,294 MEDICAL EXAMINATIONS. *R. H. Britten and J. C. Goddard. U. S. Pub. Health Rep., Jan. 1, 1932, vol. 47, pp. 1-25.*

In a previous study it was shown that the rates of physical impairment in a group of skilled workers tended to be definitely higher than in other groups (professional, business, agricultural). The present study was undertaken to determine, in so far as possible, whether the effects of specific occupational factors are sufficient to account for these higher rates. The data employed were the medical examinations furnished to white, native born, male policyholders as a part of the health service of life insurance companies. The examinations were conducted by the Life Extension Institute, and the analysis is limited to the first examinations made on each individual and to those made outside of the "head" offices of the Institute. In all, 17,294 persons in twenty-eight specific occupations were included.

It was found that the higher rates characteristic of the industrial workers were not to be explained, except in a few instances, as being due to the hazard of any specific occupation. On the contrary, these higher rates seemed to be the result of various factors associated with social, educational, or economic causes, and to be present, in more or less degree, in every specific occupation studied. Differences among the industrial occupations did not appear to be of great moment, and when found seemed to reflect either selection (the tendency of workers with certain impairments to drift into occupations where such impairments would not serve as a handicap) or the presence within the industrial occupations themselves of social or economic differences.

ABSTRACT OF THE LITERATURE
OF
INDUSTRIAL HYGIENE

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GENERAL

INDUSTRIAL ACCIDENTS AND DISEASES IN AGRICULTURE. *P. Cazeneuve. Méd. du travail, Jan., 1932, vol. 4, pp. 1–12.*

The claim is advanced that the agricultural laborer is unfairly treated in France as compared with factory workers in the matter of compensation for accidents; thus, for him only accidents due to power driven machines are compensated, while being gored by a beast establishes no claim. Further, an ever-increasing list of poisonous materials are coming to be used in the fight against parasites, such as lead and copper compounds of arsenic employed in vineyards, on fruit trees, and in sheep dip. Not only are the laborers who apply such poisons at risk, but also grape gatherers at Toulouse, who once had an outbreak of arsenical poisoning. Nicotine in tobacco juice, used to kill green fly, may cause trouble; while corrosive sublimate used on cabbages is highly toxic. Calcium cyanamide, possibly from the causticity of the lime it contains, may set up respiratory irritation and skin trouble.—E. L. C.

THE HEALTH OF CEMENT WORKERS. INQUIRIES INTO THE EXISTENCE OF HAZARDS IN THE INDUSTRY. *F. H. de Balsac, E. Agasse-Lafont, and A. Feil. Méd. du travail, Nov., 1931, vol. 3, pp. 141–163.*

A simple description is first given of the properties and composition of

cement, and of the technic of its manufacture. The chief constituents used are silica, alumina, lime, and magnesia; heat brings about a combination of the lime with the silica and alumina. The resultant is cement with the property of setting hard on the addition of water. During manufacture there is exposure to heat and to fine dust; but there are no toxic risks if the escape of carbon monoxide from the furnaces is excluded, and of sulphuretted hydrogen and sulphur dioxide which may be present as impurities. The dusts set up cement itch or eczema in a varying number of the workers, who experienced a dry, scaly, irritating eruption, aggravated by scratching, sweating, and summer heat. At the tips of the fingers the skin becomes thin and smooth; it burns and throbs, particularly at night; the condition is ascribed by the men to the heat of the cement they handle. A tendency to cough and expectorate follows prolonged inhalation of the dust, and may become chronic bronchitis. Occasionally eye trouble, with conjunctivitis or keratitis, develops if cement dust is thrown on the globe of the eye. Four investigations are detailed with information as to how these troubles vary in intensity with the exposure at different operations; in these investigations, 296 men, 321, 254, and 500, respectively, were employed at the establishments studied. Modern methods of manufacture by minimizing exposure to dust and to heat, and by reducing the amount of handling needed, are steadily lessening the risks and troubles associated with the manufacture of cement.—E. L. C.

INDUSTRIAL HYGIENE IN THE CLEANING RAG INDUSTRY. *van Themsche. Ann. d'hyg. pub., indust. et sociale, Feb., 1932, vol. 10, pp. 73-81.*

Investigation in Belgium has shown that rags are being used in factories more and more to replace cotton waste. Such rags, if infected and dirty, might be expected to expose the workers to risk from microbes or injurious dust. Although some rags are used without being cleansed, for the most part they are disinfected. Localized exhaust may be applied where soiled rags are used for cleansing. Whatever may be the custom, however, no evidence is forthcoming that workers in the rag industry, whether in preparing the rags or in using them thereafter, experience any ill effects upon their health.—E. L. C.

LITHOGRAPHY, ITS HAZARDS AND THEIR PREVENTION. *R. Krug, F. Rothe, and H. Wenzel. Schrift. a. d. Gesamtgeb. d. Gewerbehyg., no. 23, 1929, pp. 30.*

Following a brief history of the development of lithography, a description, with illustrations, is given of the machines and technical processes associated with the industry. Characteristics of the dyes and solvents used, as well as experiments conducted to obtain noninjurious solvents, are outlined; and the dangers from the fumes which arise during the mixing and drying of the dyes as well as from the cleaning of the apparatus, together with methods for their prevention, are discussed. Of especial value is the section describing the newest devices and improvements.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

RESPIRATORY POISONS AND AIR-FILTERING DEVICES. *P. Polaczek. Abstr. as follows from Ztschr. d. Ver. deutsch. Ing., 1931, vol. 75, pp. 1411–1414, in Chem. Abstr., Feb. 10, 1932, vol. 26, p. 787.*

Respiratory poisons are classified as (1) gases and vapors, (2) smokes and mists, (3) dust. The characteristics and methods of removal are described for each class. The several different types of apparatus for supplying pure air are described and explained by photographs and drawings. Fourteen commercial German gas mask filters are named and the respiratory poisons against which each is effective are indicated.—P. D.

SAFETY IN THE MANUFACTURE AND USE OF ACETYLENE. *Internat. Labour Office, Studies and Rep., Series F, Second Section (Safety) No. 5, 1931, pp. 188.*

Although the main hazards associated with the manufacture and use of acetylene are connected with fire and explosion, nevertheless there are certain possible dangers to health arising from the accidental generation of phosphoretted hydrogen and carbon monoxide. Acetylene is generated when calcium carbide is moistened. Calcium carbide itself is obtained by heating calcined lime and carbon in an electric arc; carbide requires extremely careful storage and use. If it becomes damp, acetylene may be generated in a closed container, when an explosive mixture of acetylene and air may be formed; should such a chamber become heated, explosion may result. A warning is raised against using the oxyacetylene flame in closed spaces, where the oxygen of the air may be consumed by the flame and carbon monoxide generated to a dangerous extent. When acetylene is burned in the open air, the impurities present are not dangerous. Most civilized countries have adopted regulations to control the storage and use of carbide; the text of the codes is given in the second part of this monograph. In addition to stating previous knowledge regarding the manufacture and properties of acetylene, information obtained by new research on its solubility in various fluids is given.—E. L. C.

TOXICITY OF ALUMINIUM COMPARED WITH IRON, NICKEL AND OTHER METALS. *G. Bertrand and P. Serbescu. Abstr. as follows from Ann. de l'Inst. Pasteur, Oct., 1931, vol. 47, p. 451, in Jour. Am. Med. Assn., Jan. 16, 1932, vol. 98, p. 266; also in Compt. rend. Acad. d. sc., 1931, vol. 193, pp. 128-131.*

Bertrand and Serbescu used the sulphates of copper, nickel, cadmium, cobalt, zinc, manganese, aluminium, and bivalent iron and the chloride of trivalent iron in concentrations of 1 gm. dissolved in 1 liter of double-distilled water, and injected subcutaneously into the abdomen of guinea-pigs with constant doses of 100 mg. per kilogram of body weight. They observed that stronger doses were lethal before complete absorption took place. When smaller doses were utilized, the individual differences were increased and prediction of the period of survival after injection became more difficult.

The order of toxicity from the more toxic to the least toxic is as follows: copper, nickel, cadmium, cobalt, zinc, manganese, trivalent iron, aluminium, and bivalent iron. The same differences in toxicity between copper, nickel, and aluminium were noted when rabbits were injected with doses of 100 mg. per kilogram of body weight, and the same animal individual differences were accentuated and longer periods of survival were noted when smaller doses were used. All the results show that aluminium is similar to iron and less toxic than nickel and copper when used in the manufacture of cooking utensils. The authors believe that minimal quantities of aluminium introduced artificially in food are innocuous; these quantities are no larger than those found in a normal state in the tissues of plants and animals.—C. K. D.

THE ESTIMATION OF ARSENIC IN THE EXCRETIONS, HAIR, AND NAILS. *L. Schwarz and W. Deckert. Arch. f. Hyg., Sept., 1931, vol. 106, pp. 346–365.*

The authors substantiate previous work in finding arsenic in the urine, feces, hair, and nails of normal individuals. In the case of urine an amount in excess of 830 μg. per liter was found; in feces from 1 to 80 μg. per 100 gm. of fresh stool. Arsenic occurs in the hair and nails of most people but was not found in all cases. In arsenic workers amounts were found in all cases and in far greater quantities than in nonexposed individuals.—L. T. F.

AN UNUSUAL CASE OF ARSINE POISONING. *D. Kremer. Abstr. as follows from Gasmaske, 1931, vol. 3, pp. 109–111, in Chem. Abstr., Feb. 20, 1932, vol. 26, p. 945.*

Several workmen were killed by arsine developed when waste metal, left after the purification of raw tin, was sprinkled with water. The waste contained also tin, antimony, arsenic, and aluminium. The formation of arsine was ascribed to the presence of an unstable aluminium arsenide and to the fact that the waste metal was at a temperature of about 50° when it was sprinkled with water. The same waste metal, when cold, and sprinkled with water, did not generate arsine. —P. D.

THE MANUFACTURE OF SODIUM ARSENATE AND ARSENIC ACID. *M. P. Bellon. Ann. d'hyg. pub., indust. et sociale, June, 1931, vol. 9, pp. 335–341.*

The usual method of making sodium arsenate, which is used freely as an insecticide in horticulture, has been to oxidize arsenious acid by heating it with sodium nitrate in the presence of sodium carbonate. This process generates nitrous fumes which are discharged into the atmosphere. Neighbors complain that constant breathing of air so contaminated leads to bronchial troubles, coughs, expectoration, dyspnea, and possibly cyanosis with vertigo.

The above-mentioned process is not scheduled as one liable to give out noxious fumes; but complaints were put forward and established against a firm using it. Hence the local authority interdicted it from being carried on. Whereupon the firm turned to research and discovered a process in which sodium peroxide replaces sodium nitrate and the oxidation proceeds without the evolution of nitrous fumes.

Sodium peroxide, which is already used as a bleaching agent, is made by subjecting sodium to dry air freed from carbon dioxide. The needs of public health have in this case led to improvement in manufacturing technic. Nitrous fumes are also evolved when arsenic acid is made by boiling arsenious acid with nitric acid; but the evolution is sufficient to make their recovery worth while. Hence the process is permitted only if there is no escape of noxious smells, dust, gas, or vapor. —E. L. C.

CASE OF BENZINE INTOXICATION WITH FATAL OUTCOME. *O. L. Nielsen. Ugesk. f. Laeger, Nov. 26, 1931, vol. 93, p. 1178.*

BENZOL POISONING: CASE. *D. S. Pulford. Abstr. as follows from California and Western Med., Nov., 1931, vol. 35, p. 361, in Jour. Am. Med. Assn., Jan. 9, 1932, vol. 98, p. 173.*

Pulford describes a case of acute benzene poisoning in a painter who showed hemorrhage from the gums, marked anemia, and leukopenia, which responded rapidly to repeated transfusions. The case emphasizes the necessity of considering this fast-disappearing malady in the differential diagnosis of diseases that are accompanied by marked leukopenia.—C. K. D.

THE COLORIMETRIC DETERMINATION OF MINUTE AMOUNTS OF CADMIUM. *L. T. Fairhall and L. Prodan. Jour. Am. Chem. Soc., April, 1931, vol. 53, pp. 1321–1323.*

A colorimetric method for the determination of minute amounts of cadmium is described in which advantage is taken of the intensification of the color of the sulphide under ultraviolet rays. A sensitivity of 1:2,500,000 is thus obtained and an accuracy attained of 4 per cent. in the analysis of material containing from 0.4 to 1 mg. of cadmium in 100 gm. of organic material.—*Authors' Conclusions.*

SOME DANGERS IN HANDLING SOLID CARBON DIOXIDE. *Travelers Standard, Oct., 1931, vol. 19, pp. 210–220.*

This article mentions the dangers from contact with solid carbon dioxide and from exposure to carbon dioxide gas, but is chiefly concerned with the mechanical hazards associated with the preparation of dry ice. A safety device designed to eliminate the danger from the use of band saws for this work is described and illustrated.

STUDIES IN ASPHYXIA. II. BLOOD CHEMISTRY CHANGES RESULTING FROM COMPARATIVELY RAPID ASPHYXIA BY ATMOSPHERES DEFICIENT IN OXYGEN. *H. H. Schrenk, F. A. Patty, and W. P. Yant. U. S. Pub. Health Rep., Jan. 15, 1932, vol. 47, pp. 136-146.*

A study was made of blood chemistry changes in dogs exposed to atmospheres which were depleted of oxygen at a rate which caused a progressive asphyxial condition simulating asphyxia resulting from exposure to approximately 0.6 per cent. carbon monoxide in air by volume. The conditions caused death in 11 to 28.5 minutes. The study was made not only to ascertain the changes attending asphyxia by insufficient atmospheric oxygen, but also as a parallel to a similar study of the changes attending asphyxia by carbon monoxide in order to ascertain if there were changes which

were peculiar to each type of asphyxia or if they were identical and due entirely to anoxemia.

1. There was a marked hyperglycemia and hyperuricemia; the nonprotein nitrogen and urea increased slightly; the total and preformed creatinine remained practically normal; and the inorganic phosphorus increased.

2. There was an increase in the hydrogen ion concentration and a marked decrease in the carbon dioxide capacity of the plasma, and the carbon dioxide content of the blood.

3. The oxygen saturation of the arterial blood at death ranged from 1.3 to 8 per cent.

4. The red blood cells increased in one case, but showed no significant change in two. The white blood cells and polymorphonuclears increased while the lymphocytes decreased.—*Author's Summary and Conclusions.*

POISONING WITH CARBON MONOXIDE AND POLYCYTHEMIA. *S. T. Litzner. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 1, pp. 749-753; Chim. et indust., vol. 25, p. 1403, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 214.*

Litzner discusses the following problem: Does carbon monoxide poisoning produce a modification of the blood resulting in an increase in the number of red and white corpuscles? The numerous investigations and clinical observations carried out have not yet permitted a definite positive or negative answer. It is possible that polycythemia, which has been occasionally noted, may be the tardy consequence of carbon monoxide poisoning; and Litzner even considers it probable that there is a causal relationship, but a definite answer can be given only after a systematic investigation has been carried out. Litzner recalls that polycythemia is related to troubles of secretion, particularly of the spleen, genital glands, suprarenal glands, etc., and suggests that these facts may be related to repeated carbon monoxide poisonings.

ANIMAL EXPERIMENTS ON THE EFFECT OF THE DAILY INSPIRATION FOR SEVERAL HOURS OF SMALL QUANTITIES OF CARBON MONOXIDE. *J. May. Abstr. as follows from Klin. Wchnschr., 1931, vol. 10, pp. 1130-1131, in Chem. Abstr., Jan. 20, 1932, vol. 26, p. 519.*

Dogs breathing air containing 0.02 per cent. carbon monoxide for six hours daily develop an increased red cell count, averaging 20 per cent. within fifteen days, followed by a later rise in hemoglobin. This is a preliminary report.

CASE OF SLOW LEAD POISONING WITH PECULIAR ETIOLOGY. *K. Winge. Abstr. as follows from Ugesk. f. Laeger, Nov. 19, 1931, vol. 93, p. 1154, in Jour. Am. Med. Assn., Feb. 13, 1932, vol. 98, p. 592.*

In Winge's patient with a history of gallstone colic five years earlier and anemia, bradycardia, and nervous disturbance since then, there had for the last half year been marked exhaustion with pain in the epigastrium, finally followed by pronounced pain in the epigastrium and nausea. The patient was found to have been employed for seventeen years as scorekeeper in a poorly ventilated rifle shooting gallery; the lead bullets, striking against the iron plate behind the target, where he stood, raised considerable lead dust. Examination of the gingiva and of the

blood established the diagnosis of chronic lead poisoning. The earlier symptoms are thought to have been the first signs of the disorder.—C. K. D.

LEAD POISONING IN CHILDREN. THE CEREBRAL MANIFESTATIONS. *C. F. McKhann. Arch. Neurol. and Psychiat., Feb., 1932, vol. 27, pp. 294–303.*

Lead poisoning in children produces a severe and dangerous form of cerebral involvement, the symptoms of which apparently are dependent on the development of an extreme cerebral edema. Less frequently there is encountered the peripheral neuritis commonly observed in adults with lead poisoning. Children who survive a severe lead encephalitis are frequently left with permanent neurologic disorders. The early diagnosis of lead poisoning based on a carefully taken history and physical examination, confirmed by roentgenologic and laboratory data, should lead to the institution of active therapy, which may result in the prevention of the development of serious neurologic manifestations. In the presence of the acute, severe cerebral manifestations, attention must be directed toward the control of greatly increased intracranial tension.—*Author's Summary.*

CLINICAL AND EXPERIMENTAL LEAD POISONING: SOME ROENTGENOLOGIC AND ANATOMIC CHANGES IN GROWING BONES. *J. Caffey. Abstr. as follows from Radiology, Nov., 1931, vol. 17, p. 957, in Jour. Am. Med. Assn., Jan. 2, 1932, vol. 98, p. 82.*

Caffey reports three cases of chronic lead poisoning in children, all of whom showed changes in the roentgenograms of the long bones. The roentgenologic changes consist of increase in the density of the growing portions of the skeleton. The slowly growing and non-growing portions of the skeleton appear normal roentgenologically. The roentgenologic sequelae in the bones of two children who recovered are described. These consisted of a series of "transverse lines" left behind in the diaphyses and linear rings of density in the ossification centers of the epiphysial cartilages and the carpal bones, similar to those previously reported as pathognomonic of healed scurvy. In one case, necropsy with gross and microscopic examination of the distal end of the femur indicated that, roentgenologically, there is pronounced anatomic change present at the sites of increased density. The anatomic change consists of a hyperplasia and packing together of trabecular bone in a narrow zone contiguous to the proliferating cartilage. The roentgenologic and anatomic changes in bone in clinical cases of chronic lead poisoning were reproduced experimentally by feeding lead to growing dogs. Chemical analyses of both human and dogs' bones indicate a lead deposit throughout the bones, with a higher lead content in the subepiphysial zones of roentgenologic and anatomic change than in the remainder of the shaft. Lead feeding for seventy-nine days in one fully grown dog did not result in any change either roentgenologically or microscopically, although lead was detected in these bones chemically.—C. K. D.

INVESTIGATION OF THE LEAD CONTENT OF HUMAN BONES. *E. Barth. Abstr. as follows from Virchows Arch. f. path. Anat., 1931, vol. 281, pp. 146–151, in Ber. ü. d. ges. Physiol. u. exper.*

Pharmakol., Dec. 30, 1931, vol. 63, pp. 248–249.

The bones of a number of dead persons of various ages were investigated by means of the micromethod developed at the Halle Hygienic Institute (Paul Schmidt). The bones were of people of different classes—part city dwellers and part country dwellers. They had neither been lead workers nor been exposed to lead, and the rural dwellers had not drunk water taken from a central supply. Epiphyses, diaphyses, flat bones, and red marrow were investigated separately. The lead content of infant bones varied from 0.01 to 0.03 mg. per 3 gm. of ash; that of young children from 0.02 to 0.065 mg. (average: from 0.03 to 0.05 mg.); in old people an average of from 0.08 to 0.14 mg. There was less lead in the bone marrow than in the solid bones. It is apparent that during life small amounts of lead are being taken up—from food, not from water.—L. T. F.

LEAD POISONING AS A CAUSE OF PEPTIC ULCER. *D. R. Lewis. Brit. Med. Jour., Jan. 30, 1932, vol. 1, pp. 185–186.*

The observations reported were made upon men employed in smelting spelter. The ore used contains, in addition to zinc, varying percentages of lead and cadmium. A number of interesting facts are presented concerning the health of the men. Lead absorption and lead poisoning were present in a number, nearly all of whom complained of vague pains in the stomach. The urine was almost always found to contain lead, even when there was no evidence of lead absorption present; in one man as much as 1.89 parts of lead per million was found. Out of 100 cases specially examined, twelve were suffering from gastric ulcer, verified by X-ray. Lead was present in the urine in each of these twelve cases of ulcer, five of which perforated. Apparently the older the man, the less is the amount of lead found in the urine, owing possibly to impaired renal function. The incidence of ulcer seems to bear no relation to the duration of exposure to lead fumes, although it is associated with a low urinary content of lead. The opinion that toxemia plays a part in the production of peptic ulcer would fall in line with the influence of lead in originating these cases. Certainly, the duodenum is exposed to this harmful action, since lead is eliminated by the bile.—E. L. C.

PLUMBISM AND PEPTIC ULCER. *G. A. Stephens, D. R. Lewis, J. C. Edwards-Jones, J. T. Shirlaw, and T. M. Legge. Correspondence, Brit. Med. Jour., Feb. 6, 1932, vol. 1, p. 262; Feb. 13, 1932, p. 308; Feb. 20, 1932, p. 354; March 5, 1932, pp. 449–450; and March 12, 1932, p. 497.*

Following upon the article by D. R. Lewis (see preceding abstract), a discussion has been taking place as to whether a relation exists between plumbism and peptic ulcer. While the evidence in favor is by no means conclusive, a case is made for chronic plumbism as a predisposing factor. This view is finally supported by Legge, who bases his opinion upon thousands of reports upon lead poisoning seen by him at the Home Office. —E. L. C.

THE QUESTION OF THE BODY CONTENT OF MERCURY. *Holtzmann. Arch. f. Hyg., Sept., 1931, vol. 106, pp. 377–380.*

Guinea-pigs were exposed to air saturated with mercury vapor and containing 6 mg. of mercury per cubic meter of air. Lungs and kidneys and the remaining portion of the animals were analyzed for mercury. In a few animals the lungs, liver, kidneys, urine, heart, brain, stomach, intestine, gall-bladder, and remaining tissues were analyzed. Traces of mercury varying from 2.5μg. to 1,050μg. were found in the various tissues, depending upon the time of exposure and the promptness with which the animal was killed following exposure.—L. T. F.

THE DETERMINATION OF SMALL AMOUNTS OF MERCURY. *A. J. H. Kam. Abstr. from Versl. Volksgzndh., 1931, pp. 585–601, in Ber. ü. d. ges. Physiol. u. exper. Pharmakol., Jan. 13, 1932, vol. 63, pp. 412–413.*

The organic material of urine or feces to which water has been added is oxidized with chlorine gas, the excess of the latter being removed by a current of air. Copper sulphate (20 mg. of copper) is then added, the acidity is adjusted, and both copper and mercury are precipitated as sulphides. The sulphides are dissolved and the mercury precipitated upon a fine copper wire spiral, dried over phosphorus pentoxide, and the mercury finally distilled off and determined colorimetrically with diphenylcarbazide.—L. T. F.

NICKEL SENSITIZATION FROM WHITE GOLD SPECTACLE FRAMES. *A. W. McAlester, Jr., and A. W. McAlester, 3rd. Abstr. as follows from Am. Jour. Ophth., Sept., 1931, vol. 14, p. 925, in Arch. Dermat. and Syph., March, 1932, vol. 25, p. 539.*

The authors report three cases in which contact dermatitis of the eyelids, nose, and ears was attributed to sensitization to nickel. In one case there was only pruritus; in another, erythema, and in the third, a papular and exudative dermatitis. A patch test in one case resulted in a positive reaction. All three cases cleared up when the spectacle frames were changed.

THE MANUFACTURE OF OIL VARNISHES AND BOILED OILS. *M. P. Bellon. Ann. d'hyg. pub., indust. et sociale, July, 1931, vol. 9, pp. 360–374.*

Varnishes and boiled oils when dry leave a smooth protective coat and are used to a great extent in the paint industry. Vegetable oils acquire this property of drying or oxidizing by being subjected to heat. Linseed oil is chiefly used. Varnishes are solutions of resins and balsams in evaporating solvents. The addition to the oils of metallic salts, such as oxides of lead, accelerates the drying process. Danger from fire arises when the inflammable oils are heated to 280° to 300°C., or to 200° to 220°C., according to the process in action. There also arise offensive fumes, containing acrolein, which, if they escape into the air, irritate the eyes and air passages; hence serious complaints arise in the neighborhood of factories if they are not isolated from all dwellings. In France today old processes are followed with fire danger and offensive fumes. They are unnecessary if modern methods are employed. The oils can be heated in an atmosphere of carbon dioxide, and

fumes can be collected and passed into the fire used to heat the caldron. The manufacture ought to be carried on only under strict regulations aimed at preventing danger and avoiding offense. Instances are given of the manufacture being successfully carried on under such conditions.—E. L. C.

INJURY TO HEALTH FROM DISINFECTANTS. *E. Riehm. Abstr. as follows from Nachrichtenbl. deutsch. Pflanzenschutzdienst, 1931, vol. 11, pp. 19–20; Rev. Applied Mycol., vol. 10, p. 535, in Chem. Abstr., Feb. 10, 1932, vol. 26, p. 790.*

Inhalation of dusts containing mercury has caused more or less injury to health. Respirators should be used but in some cases moistening the seed grain at the end of the dusting while still in the machine will keep down the dust so there is little if any danger to the operator.—P. D.

THE PHYSIOLOGICAL ACTION AND THERAPEUTIC POTENTIALITIES OF MUSTARD GAS. *L. D. Arbuckle. Chem. Warfare, Jan., 1932, vol. 18, pp. 1078–1086.*

FATAL POISONING BY SUBSTANCE USED IN DEVELOPING PHOTOGRAPHS. *P. Halbron, A. Bosquet, and J. Tiffeneau. Bull. et mém. Soc. méd. d. hôp., Nov. 9, 1931, vol. 47, p. 1596.*

THE EXPERIMENTAL PRODUCTION OF MALIGNANT TUMORS BY MEANS OF RADIO-ACTIVE SUBSTANCES. *F. Daels and R. Biltris. Abstr. as follows from Bull. Assn. franç. pour l'étude du cancer, 1931, vol. 20, p. 32, in Am. Jour. Cancer, Jan., 1932, vol. 16, pp. 1-2.*

The authors summarize the results of their extensive experiments carried out over a number of years. Small tubes of glass filled with radium or blocks of paraffin containing radium were inserted into the pleural, peritoneal, and cranial cavities, and subcutaneously. Silk thread impregnated with collodion containing radium was passed through various organs.

In white rats ten sarcomas developed from eight to twenty-two months after subcutaneous radium implantation. One of these tumors, a spindle cell sarcoma, is now in its tenth transplantation. In white mice three sarcomas of the anterior abdominal wall developed after eight months.

The authors have been surprisingly successful with guinea-pigs. In two instances they produced sarcoma of probable meningeal origin twelve and twenty-five months, respectively, following intracranial radium implantation. In three animals carcinoma of the liver, probably originating from the bile ducts, appeared after nineteen, twenty-one, and thirty months, respectively. An adenocarcinoma of the stomach was found after nineteen months. Two sarcomas of the kidney developed after twenty-two and twenty-three months, respectively.

Rabbits were very refractory. Only granulomas have been produced by radium implantation in these animals.

Daels and Biltris claim that their technic is superior to any other for the production of experimental tumors in internal organs.

EXPERIMENTAL INVESTIGATIONS ON ATYPICAL EPITHELIAL GROWTH. ATYPICAL EPITHELIAL GROWTHS IN THE LUNGS IN THE PRESENCE OF INFLAMMA-

TION INDUCED BY INTRAPULMONARY INJECTIONS OF COAL TAR. *W. G. Garschin and J. A. Pigalew. Abstr. from Ztschr. f. Krebsforsch., 1931, vol. 33, p. 631, in Am. Jour. Cancer, Jan., 1932, vol. 16, p. 5.*

The authors introduced directly into the lungs of rabbits a gas works tar of proved carcinogenicity, injecting 0.1 c.c. with a syringe which entered through an intercostal space to one side of the vertebral column. In twenty-nine animals the operation succeeded, but in a number of others it was found that the tar had been inadvertently deposited in the pleural cavity. The animals were sacrificed from one and a half to eighty days after injection.

Atypical epithelial proliferation was found bearing a certain morphologic resemblance to cancer, but without the biologic characteristics of malignancy. The overgrowth was not directly elicited by the tar, however, but secondarily by the chronic inflammation which this irritant set up, for hyperplasia occurred only in the presence of a histiocyte reaction—never where tar lay in direct contact with epithelium. Thus the effect of tar on the bronchial epithelium is quite different from that which it exerts on the skin. It has been shown by Schabad that rectal epithelium is totally destroyed by the tar, the epithelial layer being so thin that no deeper zone of cells remains from which regeneration might start. In the present experiments, too, the epithelium was entirely destroyed, and regeneration took place from bronchi and alveoli untouched by the tar.

[The time which must elapse before tar cancer develops in the skin of the rabbit is, on the whole, more than 150 days. If the authors had not killed their rabbits before this period had been but half completed, they might have found carcinoma.]

EXPERIMENTAL TAR TUMOURS IN THE WHITE RAT. *A. F. Watson. Abstr. as follows from Jour. Path. and Bacteriol., 1931, vol. 34, p. 301, in Am. Jour. Cancer, Jan., 1932, vol. 16, p. 6.*

On the hypothesis that the insusceptibility of rat skin to tar might be due to the protection against absorption which its thick layer of keratinized epithelium would conceivably afford, the author applied a petroleum ether extract of rat tissues at the site of and preceding the tar applications. From this extract the petroleum ether had been removed by distillation, the final product representing, therefore, a mixture of fats and fatty substances—for previous work had shown that by treatment of the skin with suitable fluid fats the tendency to development of tar tumors in the mouse could be increased. The tar used in the present experiment was a gas works coal tar.

Skin tumors appeared in two male and two female rats from an original litter of six males and five females, during the period from the 415th to the 551st day after the initial tarring.

The tumors in the males were squamous cell carcinomas of vigorous growth, and in one animal there were extensive metastases in the lungs, kidneys, and pleural cavity. Inoculation of the tumors of these animals into normal rats was unsuccessful. In the females the growths increased less rapidly in size, and in only one of the

two could any histologic evidence of infiltration be discovered.

CHANGES IN THE LIVER IN RABBITS WITH TAR CANCER. *A. Babes. Abstr. as follows from Bull. Assn. franç. pour l'étude du cancer, 1931, vol. 20, p. 420, in Am. Jour. Cancer, Jan., 1932, vol. 16, p. 7.*

The author has already described degeneration and necrosis of the parenchyma in the liver of rabbits which die during the first ten days of tarring, and proliferation of the hepatic cells in those that live more than ten days (*Bull. Assn. franç. pour l'étude du cancer*, 1929, vol. 18, p. 328). These lesions are constant and very pronounced.

In the present paper he records the changes found in this organ among thirteen rabbits that survived tar painting long enough for seven of them to develop carcinoma. These were, in brief, very active proliferation of the parenchymal cells and a hypertrophy affecting particularly their nuclei, the two processes being generally more intense in rabbits with cancer and increasing in proportion to the development of the tumor.

The author regards this alteration as equivalent to that proliferative process in the tarred skin which precedes the appearance of cancer, and is inclined to attribute both to one common cause. Together with somewhat similar occurrences in the spleen these proliferative changes are an expression of some still unknown stimulus which tar in appropriate doses exerts upon the cells of the organism, and especially upon those of the epidermis.

The development of tar cancer in particular, and of cancer in general, may thus be considered, in part, as an outcome of some constitutional condition.

DUST HAZARDS AND THEIR EFFECTS

THE IMPINGER DUST SAMPLING APPARATUS AS USED BY THE UNITED STATES PUBLIC HEALTH SERVICE. *L. Greenburg and J. J. Bloomfield. U. S. Pub. Health Rep., March 18, 1932, vol. 47, pp. 654–675.*

The object of the present contribution has been to describe the design and construction of an apparatus for the sampling of atmospheric particulate matter. This device, known as the impinger apparatus, possesses the advantage of high dust catching efficiency when sampling air over the full range of dustiness (from relatively pure outdoor air to that found in very dusty coal mining operations) at the relatively rapid rate of 28.3 liters (1 cubic foot) per minute. The dust is caught in a liquid medium in which it may then be counted and analyzed microscopically, gravimetrically, and chemically. Three forms of the instrument are described: the electrically driven, the compressed air driven, and a hand actuated form. Photographs and drawings of the apparatus have been provided.

The results of the sampling of various dusts, as well as of chromic acid mists and lead fumes, are cited in order to show the range over which this instrument may be used.—*Authors' Summary.*

SAFETY CODES FOR THE PREVENTION OF DUST EXPLOSIONS. *U. S. Dept. Labor, Bur. Labor Statistics, Bull. No. 562, Dec., 1931, pp. 87.*

The safety codes for the prevention of industrial dust explosions included in this bulletin are the work of a committee sponsored by the National Fire Protection Association and the United States Department of Agriculture. They have been adopted by the National Board of Fire Underwriters and chosen by the American Standards Association as "American Standards." This publication is an enlarged edition of the earlier work which was published in Bulletin No. 433 of the United States Bureau of Labor Statistics. Safety codes are given for the following industries: starch factories, flour and feed mills, terminal grain elevators, pulverizing systems for sugar and cocoa, spice grinding plants, wood flour manufacturing, pulverized fuel systems, and coal pneumatic cleaning plants.

Methods of prevention are treated under the general headings: location, building construction, electric power and lighting, control and removal of suspended dust, prevention of ignition, mechanical precautions, and housekeeping. The use of inert gas for fire and explosion prevention is treated in a separate section, and includes details concerning the amount of gas required, design of gas supply equipment, and operation.—T. H.

THE FIXATION OF MINERAL DUSTS IN THE HUMAN LUNG. *A. Policard. Bull. hist. appl. à la physiol. et à la path., Dec., 1930, vol. 7, pp. 337–353.*

Special treatment of lung tissue by hydrochloric acid and by micro-incineration discloses that adult lungs, apart from any pneumonokoniosis, contain many particles of soot and a large amount of ash. They represent particulate matter inhaled during life. The lungs of adults, but not of infants, are chemically rich in ash, particularly in silica ash. Mineral and silica particles are not peculiar to the lungs of miners; and pulmonary sclerosis due to silica is not entirely confined to certain occupations. It is a question of degree. The air of modern towns contains dust which is inhaled, and the particles which accumulate in the lungs are not always innocuous.—E. L. C.

PNEUMONOCONIOSIS: PARTIAL REVIEW OF LITERATURE. *W. L. Cooke. West Virginia Med. Jour., Jan., 1932, vol. 28, p. 19.*

ASBESTOSIS: TWO CASES. *H. L. Stewart, C. J. Bucher, and E. H. Coleman. Abstr. as follows from Arch. Path., Dec., 1931, vol. 12, p. 909, in Jour. Am. Med. Assn., March 5, 1932, vol. 98, p. 848.*

Stewart and his associates report two cases of pulmonary asbestosis. In the first case the symptoms were relatively unimportant. In the second case the disease was concomitant with tuberculosis and, with it, was the cause of death. The similarity between some of the features of tuberculosis in childhood and tuberculosis complicated by asbestosis is suggested. In asbestosis the lung is not the only organ invaded by asbestosis bodies. The authors show that the spleen and lymph nodes may harbor large asbestosis bodies. They believe that from the histories of the cases they report there appears to be a fur-

ther need for study along the lines of prevention of this disease.—C. K. D.

PULMONARY ASBESTOSIS. *E. Krüger, Rostoski, and Saupe. Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 558-590, in Bull. Hyg., Dec., 1931, vol. 6, pp. 861–862.*

After an exhaustive survey of the work on pulmonary asbestosis in other countries, the authors give an account of the work done in Germany together with a short record of cases of the disease which have come under their own observation in Dresden.

The first record in Germany was a demonstration by Fahr to the Medical Society of Hamburg in 1914 of specimens and photomicrographs of a case of pneumonokoniosis in an asbestos worker. Fahr mentioned the occurrence of a large number of crystals in the lung but did not describe them more closely. He stated, however, that they had been seen by Marchand and Riesel in 1906, who had speculated as to whether they were due to the inhalation of asbestos dust or were a hemoglobin derivative. In 1931 Büttner-Wobst and Trillitzsch described nine cases occurring in two asbestos factories near Dresden. Meanwhile the authors of the present paper had begun to collect cases. They have now examined fifty-two (eighteen male and thirty-four female) workers, of whom thirty showed definite lung changes. A short analysis of the history of these cases is given. The longest exposure to the dust was thirty-one years in a worker aged 60.

The commonest initial complaint was dyspnea. Cough occurred in 43 cases. Night sweats were recorded in 12 cases. Abdominal complaints were rare but loss of weight in the late stages was found in 15 instances with rheumatic pains, headache, and general nervous symptoms. Among the 34 female cases abortions were recorded in 10. Conjunctivitis was found in 16. Pharyngeal symptoms were not infrequent. Enlargement of the thyroid was seen on 6 occasions, with definite Basedow symptoms in 5. There were 4 cases of kyphosis and 4 of scoliosis.

The pulmonary signs were as follows: The respiratory excursion was diminished. In 16 cases there were alterations in percussion note on auscultation at the apex, while in the rest diminished breath sounds with fine râles, etc., were more marked in the lower lobes. In some cases there was also evidence of pleural thickening. Sputum was present in 28, 12 showing asbestos fibers and 8 asbestosis bodies; there was no blood, and no tubercle bacilli or elastic fibers could be found. Cardiac enlargement was noted in 3 instances, 1 case displayed an aortic systolic bruit and 6 a mitral bruit, but they were apparently compensated lesions. The blood pressure was never below 100 and in 8 cases was between 150 and 170 mm. The hemoglobin in 2 cases fell to between 60 and 70 per cent., and in 14 others was between 70 and 80 per cent. Clubbing of the fingers was noted only once. The urine was frequently alkaline or neutral (20 instances); traces of albumin were noted in 18 cases. A strong urobilinogen reaction (red coloration with benzaldehyde in the cold) was obtained.

For X-ray films the following exposure data are given: focus film distance 1.5 m., 300 m.A., 45 KV, 0.05 to 0.08 seconds. Especial emphasis is laid on the importance of short exposure. Three stages in the development of the radiologic picture are defined: (1) an increase of the normal lung striation with the appearance of a fine network often difficult to determine except by a long series of films; (2) a thicker network with delicate sharply defined spots of opacity (*Fleckenschatten*); (3) an intensification of this network to

form a shadowy veil covering the lung. The signs begin to appear and are most marked in the midzone and lower lobe areas of the radiologic picture. The contour of the heart shadow became ill defined in the second stage. The root shadows were not affected in this stage but showed enlargement in the third stage. The infraclavicular areas remained clear and there was no "snowstorm" appearance such as characterizes the typical silicosis film. In six cases signs of obsolete tuberculosis were recognized (primary complex). Tuberculous foci were generally thicker than asbestosis foci and more easily distinguished than in other forms of pneumonokoniosis. Signs of old pleurisy were frequent.

Four short statistical tables are given showing the relationship of the asbestosis to the period of exposure, type of work, etc. The general conclusion is that moderately severe asbestosis takes about five years to develop. Of the workers examined who had had ten years' or more exposure none were free from signs of the disease. In correlating their findings with the different types of work in the two asbestos factories concerned the authors point out that the numbers are too small for very definite conclusions to be drawn. The four most advanced cases were found in the spinning and twining (*Zwirnerei*) sections. A summary of fifteen cases classified into stages 1, 2, and 3 of the disease is given (see X-ray findings). Several radiograms are reproduced.—S. R. G.

THE NEED FOR DUST-PREVENTION MEASURES IN THE COAL INDUSTRY. *Proc. So. Wales Inst. Eng., 1932, vol. 47, no. 5, pp. 729–743.*

Attention is drawn to the work recently done upon the pathologic condition of the lungs of coal miners, brought about by the inhalation of dust during their work. Undoubtedly a great development of fibrous tissue is found in the lungs. In certain cases coal dust is collected in the fibrotic tissue to such an extent as to justify the condition being called silicoanthracosis. Such lungs do not appear to succumb readily to tuberculous infection; possibly this is due to the fact that the adsorbing power of the coal dust renders inert the toxic principle of tuberculin. Where the silicotic condition is paramount, as in hard heading workers, the tendency to tuberculous infection is on all fours with that found among gold miners. Coal miners' lung is not normal; the miner suffers from breathlessness and dyspnea, with a high death rate in late life from bronchitis. The causation of such trouble is dust; and every possible precaution should be taken to minimize its presence in the air.—E. L. C.

HISTOCHEMICAL RESEARCH ON THE INITIAL LESIONS OF EXPERIMENTAL PULMONARY SILICOSIS. *A. Policard. Compt. rend. Acad. d. sc., July 20, 1931, pp. 197–199.*

Cellular masses containing silica particles, called plaques, appear in animals exposed to the inhalation of silica dust; rats were used. These plaques are accumulations in alveoli of cells—dust cells—arising from the pulmonary stroma, loaded with mineral particles. The size of the plaques is limited by that of the alveoli from which they cannot escape. They have a high mineral content, due to silica in an organic combination which

kills and petrifies cytoplasm. Plaques so mummified cannot escape by the air passages, but remain and provoke fibrous reaction in the surrounding tissue. The degenerate cytoplasm, rich in silica, is an excellent medium for the growth of tubercle bacilli.—E. L. C.

EXPERIMENTAL PULMONARY SILICOSIS. *A. Policard. Abstr. as follows from Bull. hist. appl. à la physiol. et à la path., 1931, vol. 8, pp. 190-206, in Physiol. Abstr., Jan., 1932, vol. 16, p. 584.*

Experimental silicosis was produced in white rats by repeated inhalation of dust from silicious rocks. The cells seem to undergo a mineral impregnation accompanied by a resistance to staining, an enormous increase of ash as shown by micro-incineration, and a sort of mummifying of the protoplasm which resists all digestive autolysis. The plaques are formed by the accumulation within an alveolar cavity of cells with silicious particles.—C. K. D.

THE RETARDATION OF LYTIC PROCESSES BY COLLOIDAL SILICA SOLUTION. *S. L. Cummins and C. Weatherall. Abstr. as follows from Brit. Jour. Exper. Path., 1931, vol. 12, pp. 239-244, in Physiol. Abstr., Feb., 1932, vol. 16, p. 724.*

Preservation from lysis in human blood or serum by colloidal silica solution extends to other serum-soluble bacteria besides the typhoid bacillus. The solution also preserves type 1 pneumococci from lysis in ox bile and retards both tryptic and peptic digestion of albuminous substances. The addition of colloidal silica sol to a cellular exudate produced by intraperitoneal injection of dust particles leads to the agglutination of the leukocytes and dust cells and to their preservation intact for two months and upward. The bearing of these observations on pulmonary silicosis is discussed.

INDUSTRIAL HYGIENIC PROBLEM OF THE COPPER-MINING INDUSTRY. *F. V. Meriweather. Abstr. as follows from Arizona Pub. Health News, 1931, vol. 64, pp. 26–36; U. S. Pub. Health Eng. Abstr., Sept. 19, 1931, vol. 11, IHS, p. 12, in Chem. Abstr., March 10, 1932, vol. 26, p. 1361.*

Since many Arizona copper ores contain from 68 to 69 per cent. of silica, the problem of silicosis among workers in the mines is serious. The problem is discussed.—P. D.

PNEUMONOCONIOSIS WITH SPECIAL REFERENCE TO STONEMASONS. *P. Heffernan. Tubercle, Feb., 1932, vol. 13, pp. 193–199.*

The main interest in this article lies in the questions asked and the information given regarding the physical chemistry of silica containing compounds. The dust of free silica is accepted to be toxic, and the dust of combined silica to be nontoxic. But asbestos, always spoken of as magnesium silicate, is composed of magnesia contained in minute pores of a silica matrix, which forms the asbestos fiber; the magnesia can be dissolved, leaving a fiber of pure silica; this physical form may explain the toxic properties of asbestos. On the other hand, certain innocuous shales contain a fair proportion of quartz particles; but these particles are so protected by argillaceous mate-

rial as to prevent them from reacting with their environment. Medically the term "shale" is unfortunate, as some, which ought rather to be called "grits," are definitely harmful. The author, after these interesting, rather theoretical discussions, closes by pointing out the clinical and pathologic differences which exist between simple and infective silicosis.—E. L. C.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

OCCUPATIONAL ECZEMA DUE TO CEMENT. HEMOCLASTIC CRISIS FOLLOWING CONTACT TEST. *Gougerot, R. Cohen, and Ganot. Abstr. as follows from Bull. Soc. franç. de dermat. et syph., July, 1931, vol. 38, p. 1135, in Arch. Dermat. and Syph., March, 1932, vol. 25, p. 543.*

A patient who had worked with cement for some time with impunity suddenly developed a sensitivity to it, as expressed in a dermatitis that cleared up on removal from contact with the substance but recurred on resumption of his work. A patch test with the cement gave a positive reaction in a few hours, which was accompanied by a hemoclastic crisis, as manifested by a fall in blood pressure and a rising leukocytosis.

THE ETIOLOGY OF "MILKERS' NODES." *A. P. Dolgov and M. A. Morozov. Abstr. as follows from Sovet. Vest. Dermat., April, 1931, vol. 9, p. 338, in Arch. Dermat. and Syph., Dec., 1931, vol. 24, p. 1093.*

Most authors believe that the eruption on the hands of milkers known as "milkers' nodes" is due to vaccinia infection from cows. The authors of this article have observed thirty cases in different regions of the Moscow district, eleven of which were examined thoroughly in the clinic. In each case the cows were examined and were found free from vaccinia. However, the cows were affected with a peculiar zoonosis which produced these nodules in men. They resemble the eruption that Pirquet produced in association with typical vaccine efflorescences by inoculation of vaccine detritus, and which he called "paravaccinia" (vaccine rouge of the French). In all early cases of milkers' nodes the authors found in men as well as in animals the Strongyloplasmata, small round bodies believed by Lipschuetz to be the causative agent. The Strongyloplasmata-paravaccinia cannot be differentiated either morphologically or tinctorially from the causative agent of vaccinia (elementary bodies of Paschen), but in contradistinction to the latter, the paravaccine does not produce keratitis in rabbits (Paul's test). In six patients, histologic examination of nodes in different stages was made. In the corium inflammatory changes were found; in the older lesions the structure of granuloma was present, but in no case were epithelial changes of the type found in vaccinia seen. Inoculation into the skin and cornea of guinea-pigs and rabbits was negative. Auto-inoculation in nine patients gave a negative result, and only one patient responded positively; however, the culture revealed a staphylococcus in this case. When the affected milkers were inoculated with vaccine lymph, eight gave early reactions of different degree, and on revaccination three gave a

positive reaction which left a scar. When the disease was transferred from the affected milkers to cows, the same skin eruption appeared that Lipschuetz described under the name of para-vaccine. The authors conclude that milkers' nodes may be called para-vaccine caused by a virus that differs from the vaccine virus.

SHOE-LEATHER DERMATITIS. *D. J. Lloyd. Brit. Med. Jour., Feb. 6, 1932, vol. 1, p. 261.*

The British Leather Manufacturers' Research Association has never been able to incriminate para-phenylene-diamine in dyed leather as a cause of dermatitis. Leather dermatitis may be due to free chromic acid or water soluble dyestuffs left over from the dyeing process. Sumach is also a possible cause; but the Association has not heard of a case so originated.—E. L. C.

SHOE-LEATHER DERMATITIS. *J. A. Blair. Correspondence, Brit. Med. Jour., Jan. 23, 1932, vol. 1, pp. 171-172.*

Dermatitis venenata caused by shoe leather may be due to the sumach process of tanning, since sumach may be toxic, depending on the variety of Rhus from which it is prepared. The poison of these plants is a volatile acid, and the fumes will excite inflammation of the skin, running into vesicles and eczema in severe cases. Sumach is a valuable material for tanners, but leather so tanned should not be made up into unlined shoes.—E. L. C.

EYE PROTECTION IN INDUSTRY. *L. Resnik. Abstr. as follows from Sight-Saving Rev., June, 1931, vol. 1, p. 7, in Am. Jour. Ophth., March, 1932, vol. 15, p. 289.*

Fifteen per cent. of the blind of America lost their sight because of occupational hazards. In terms of workmen's compensation, the eye hazards of industry are more serious than any other group of accident hazards, with the single exception of those resulting in death. More money is paid by employers each year as compensation for eye injuries than is paid for injuries to any other part of the body. In the principal industrial states, a total of more than $10,000,000 a year is paid to workmen who have lost all or part of their sight; and this, the direct cost, presents only part of the picture. Analysis of some 75,000 accidents by the Travelers Insurance Company shows that the indirect loss to industry from accidents generally is four times as great as the direct loss, or the amount represented by compensation payments. The eye hazards of industry are enumerated and discussed.

The most important part of the paper is an outline prepared by the National Society for the Prevention of Blindness and entitled "A self-appraisal for safety engineers and other executives concerned with conservation of vision in industry." This outline covers the subject from the viewpoint of the industrial plant, the worker, and the job, and puts fifty-nine questions for those interested in this work.

THE FATE OF FOREIGN BODIES WHICH REMAIN INSIDE THE EYE. *J. Fejer. Am. Jour. Ophth., March, 1932, vol. 15, pp. 224–227.*

"Three cases are reported in which metallic foreign bodies were retained from five to eighteen years. Two eyes

kept useful vision. In the third case a shrunken globe was removed because of inflammatory symptoms and histological examination showed recent suppurative process due to the presence of the foreign body."

Occupational Pathology of the Eye. *A. J. Samoilov. Publication of Obuch Institute for the Study of Occupational Diseases, 1929, vol. 1, pp. 76. Abstr. in Am. Jour. Ophth., Jan., 1932, vol. 15, pp. 68–69.*

The result of three years of work and a study of over a thousand eyes exposed to the constant impact of metal dust has been the demonstration of a specific occupational corneal anesthesia, present to the extent of 92 per cent. among lathe workers (turners). The anesthesia was found to be independent of corneal scars (present in 20 per cent. of the workers), absent in a control group of workers exposed to atmospheres heavily laden with non-metallic dust of coal and earth, and not related to drying of the cornea as shown by a control group of tobacco workers. Intravital staining with methylene blue and neutral red and slit lamp microscopy gave the clue to the pathogenesis of the anesthesia. A widespread microscopic necrosis of surface epithelium was noted and a striking diminution of the number of "nodes," regarded as end-organs of the nerves, was observed. These and the minute xerotic dimples found make a picture analogous to a lesion of the trigeminus, and are explained as the result of the bombardment of the sharp metal particles against the cornea. The condition explains the disproportionate results from insignificant trauma noted among the workers, their failure to react to and report the presence of foreign bodies, and the high incidence of eye injuries—one-third of all injuries. That protective glasses alone are not a sufficient measure and that of more importance is a system of exhaustion of the metal dust particles is the lesson derived from this study. Other papers deal with the minimal visual acuities found compatible with the performance of various industrial tasks, for the purpose of vocational guidance and industrial selection.

Occupational Diseases of Boiler Makers Working with Pneumatic Tools. *Papers of Leningrad Institute for the Study of Occupational Diseases, 1926, vol. 1, pp. 360.*

Collected Expert Opinions on Occupational and Traumatic Disability. *Ibid., 1928, vol. 3, pp. 230.*

Attempt at a Comparative Clinico-Statistical Study of Occupational Pathology. *Ibid., 1929, vol. 4, pp. 400.*

Abstracted in Am. Jour. Ophth., Jan., 1932, vol. 15, pp. 68 and 70.

Of the Collected Expert Opinions of the Leningrad Institute a large number deal with traumatic neuroses. Fourteen out of eighteen cases followed head injuries. Ten cases were injuries accompanied by loss of consciousness, and 50 per cent. showed repeated traumas in the past history, not necessarily occupational. This, in the opinion of Vigdortchik, the Editor, is hardly a coincidence, and suggests a chronic progressive condition with the last trauma acting as the final straw.

Cataracts in persons exposed to

radiant energy are diagnosed as occupational if exposure has been for more than five years, if the person is less than 50 years old, and in the absence of other etiologic factors.

Interesting data are contributed by Alenitzin in Volume 1 of the Leningrad Institute papers. In a study of boiler makers, 67.7 per cent. were found with corneal scars, the longer the period of employment the greater the percentage, and, independently of duration of employment, the older the individual the more scars in the pupillary zone. Scars follow injuries with greater probability than in the young. On the other hand a very high prevalence of chronic conjunctivitis was noted by Alenitzin in the groups of workers studied in Volume 4.

CRITICAL AND EXPERIMENTAL OBSERVATIONS ON SO-CALLED ULTRA-RED CATARACTS OF RABBITS AND ON CATARACT FROM HEAT. *H. Goldmann. Abstr. as follows from Graefe's Arch., 1930, vol. 125, p. 313, in Am. Jour. Ophth., Jan., 1932, vol. 15, pp. 81–82.*

The author found in the literature no reports indicating that infra-red or heat rays could produce direct injury to the lens without affecting other parts of the eyeball. In the living pigmented eye, no changes in the lens from ultra-red or heat rays occurred when the iris was screened. Whenever the iris was also exposed to these rays opacities in the lens began to develop. Consequently Vogt's cataract in the rabbit could not be explained as due to direct action of the rays upon the lens but to contact with the lens of the overheated iris. In albino rabbits very slight changes at the lens suture were produced but always in conjunction with disturbances in the cornea or iris. Measurements of the temperature of the iris in pigmented rabbits demonstrated that a higher temperature of the iris than 55° was necessary for the production of cataract within fifteen minutes, and that by radiation an iris temperature of 70° was easily obtainable. Irrigation of the cornea inhibited the formation of corneal opacities by protecting it from excessive overheating, while copious irrigation with solutions of lower temperature also inhibited the formation of cataract.

Heat cataract is really therefore uveitic cataract or the result of chronic heat action in which the iris particularly functions as the conveyor of heat to the lens. On the one hand the lens absorbs all rays and transforms the energy of the rays into heat; on the other hand it takes up convective warmth from the anterior part of the eyeball. If this opinion is correct, there must exist an indirect heat cataract without any damage to the iris, since changes in the iris are never found with heat cataract.

INDUSTRIAL SURGERY

INDUSTRIAL ASPECTS OF TRAUMATIC SURGERY. *H. C. Marble. New England Jour. Med., Sept. 3, 1931, vol. 205, pp. 492–493.*

The author outlines the system of scoring end results—one year after injury—in the Fracture Clinics of the Massachusetts General Hospital. Four cases are presented by way of illustration.

BURNS. *G. Riehl, Jr. Abstr. as follows from Arch. f. Dermat. u. Syph., Nov. 19, 1931, vol. 164, p. 409, in Jour. Am. Med. Assn., Feb. 6, 1932, vol. 98, p. 515.*

Riehl's treatise on burns is based on a material of 2,327 cases. In the first part he gives statistics and discusses the prognosis. In regard to the latter he states that the life expectancy is determined by the extension and by the severity of the burns; that is, by the mass of the burned cutaneous tissue. In cases in which more than one-third of the body surface is involved the mortality rate is 100 per cent.; of those persons in whom from one-fourth to one-sixth is involved, only a few recover; if one-eleventh of the skin is burned the mortality is still 50 per cent., and if smaller areas are burned the mortality rate is less. The prognosis is more favorable if suitable therapeutic measures are instituted, such as sodium chloride infusions and removal of the crusts. In the discussion on the therapy of burns, the author mentions in addition to the sodium chloride and sugar infusions also blood transfusion. The latter gives favorable results, but it should be preceded by venesection. Local treatment and water bed therapy are also evaluated. The author further discusses the various complications of burns and gives especial consideration to the toxic exanthems. Studies on the changes in the cerebrospinal fluid gave additional proof for the theory that death from burns is due to an accumulation of toxins in the organism. In the last part of the article, the changes in the central nervous system are discussed. In patients in whom death followed shortly after the burning, there was marked vasodilatation with cerebral edema and the beginning of secondary changes of the vascular walls and of the parenchyma. In persons who survived longer, progressive proliferation of the vascular walls, degenerative changes up to a lacunar condition, and hyperplasia of the neuroglia were noted. Absent in both groups were severe, regressive, vascular changes with hemorrhages or softening. The atypical neuroglia reaction, namely, the formation of Alzheimer cells, which develops in late cases, is said to indicate impairment of the liver.—C. K. D.

ELECTRIC BURNS AND SHOCK. *R. F. McGandy. Minnesota Med., Aug., 1931, vol. 14, pp. 701–705.*

The author confines himself to the discussion of third degree burns and their treatment, inasmuch as first and second degree burns, such as flash burns, produced as a rule by indirect contact, do not differ materially from similar burns produced by other means. There is a general discussion of electric shock.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

CONTRIBUTIONS TO THE PHYSIOLOGY OF SEVERE MUSCULAR WORK. V. MINUTE-VOLUME AND STROKE VOLUME OF THE HEART DURING SEVERE MUSCULAR WORK. *E. H. Christensen. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 470–502, in Chem. Abstr., Jan. 10, 1932, vol. 26, pp. 182–183.*

The minute-volume of the heart during rest and during work on a Krogh ergometer was determined in 325 measurements on four female and three male subjects by means of Christensen's adaptation of the acetylene method of Grollman (*Chem. Abstr.*, vol. 23, p. 3942). The values per minute were: work, 480 to 1,680 kg.m.; oxygen absorption, 0.22 to 3.94 liters; minute-volume, 4.1 to 37.2 liters. The stroke volume varied between 50 and 209 c.c. The values agreed well with those found by earlier authors who used either the nitrous oxide method or methods based upon the Fick principle. The marked lowering of the pulse rate and the consequent increase in stroke volume which took place during training are apparently to be explained by hypertrophy of the heart. The limits of adaptation of the heart can be expanded only by continually increasing the intensity of the work, not by the performance of work of uniform intensity throughout the period of training.

THE BLOOD DISPLACEMENT IN MAN AT HIGHER ENVIRONMENTAL TEMPERATURES. II. THE MINUTE-VOLUME DURING BODILY WORK AT HIGHER ENVIRONMENTAL TEMPERATURES. *M. Marshak. Abstr. as follows from Ztschr. f. d. ges. exper. Med., 1931, vol. 77, pp. 133–143, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 194.*

Modified methods were used for studying the carbon dioxide content of venous blood and obtaining samples of alveolar air. The minute-volume was determined with standard work of average difficulty at an environmental temperature of 18 to 20°, 25°, 30 to 40°, and 46° with average relative humidity. The results show that the minute-volume remains at the same height during work at a temperature of 20 to 30 to 40°. Only at 46° (40° with one subject) when the overheating of the organism and an increase of the gas metabolism began was a certain increase in the minute-volume demonstrated. The muscular work at high temperature conditions is accompanied by a significant outflow of blood from the internal organs to the working muscles and skin, with a corresponding decrease in the blood supply to the internal organs.

1. VARIATIONS IN WORKING EFFICIENCY DUE TO WEARING GAS MASKS. *W. A. Gorowoi-Schaltan. Milit.-Med. Ztschr. (Moscow), 1930, vol. 1, no. 5–6, pp. 91–101.*

2. *Idem.* ERGOGRAPHIC PHENOMENA. *D. G. Bogen. Ibid., pp. 102–107.*

3. *Idem.* TEST OF DYNAMIC COORDINATION. *D. G. Bogen. Ibid., pp. 108–113.*

Abstracted as follows in Bull. Hyg., Dec., 1931, vol. 6, p. 860.

1. Forms of work requiring the use of sight (for both coordination and differentiation) are most affected by the gas mask. The working efficiency is lowered after a short use (from fifteen minutes to one hour) of the mask. This lowered efficiency is not due to any insufficient protection afforded by the gas mask but to the optical defects of the mask itself—decreased field of vision, blurring of the glass by perspiration, etc.

2. The mechanical muscular efficiency as measured by the ergograph is not affected by the mask.

3. The emotive influence of unrest, even under laboratory conditions,

tends to lower the working efficiency independently of the wearing of the gas mask. It is naturally liable to considerable individual variations.—A. O.

STRENUOUS WORK BY A HEAVY DRINKER AS INFLUENCED BY ALCOHOL. *E. Atzler and F. Meyer. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 410–432, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 211.*

The effect of the ingestion of 240 c.c. C_2H_5OH (beer and spirits) on the total performance to exhaustion and on the rate of work on a Krogh ergometer with a worker accustomed to large amounts of alcohol was determined after alcohol was taken twelve hours, four hours, and immediately before the work was begun. When alcohol was taken twelve hours before work, the total performance was 10 per cent. less and the rate of performance 4 per cent. less than on the control days. Neither the total performance nor the rate was affected by alcohol taken four hours before work. When alcohol was taken immediately preceding the work, the rate was increased but the duration of work was shorter, so that the total was the same as on the control days. The differences were ascribed to the variations in the impressions of the subject with reference to the onset of fatigue and the resistance of the ergometer.

THE OUTGO OF ENERGY AND EFFICIENCY OF A HEAVY DRINKER AS INFLUENCED BY ALCOHOL. *F. Meyer. Abstr. as follows from Arbeitsphysiol., 1931, vol. 4, pp. 433–442, in Chem. Abstr., Jan. 10, 1932, vol. 26, p. 211.*

The basal metabolism of a heavy drinker was not changed by the ingestion of 240 c.c. of alcohol taken either during two hours before or on the evening preceding the measurement. The respiratory quotient was lowered 0.03 to 0.04; this indicated that the alcohol was but slowly burned. The efficiency of muscular work was not changed when this quantity of alcohol was taken immediately preceding or two hours before the work began, but was lowered by 7 per cent. when taken twelve hours previously. The combustion of alcohol was not accelerated by muscular work and the oxygen debt was the same during the alcohol and control experiments.

ON THE RATIONALIZATION OF FLUID INTAKE IN HOT TRADES. *O. Dukelsky. Gigiena, bezopasnosti i patologia truda, 1931, no. 3, pp. 9–16. (Translation of Author's Summary.)*

The writer reports on the continuation under industrial conditions of the experiments undertaken in an earlier work (see THIS JOUR., 1930, vol. 12, Abstr. Section, p. 106) on the rationalization of fluid intake under high temperature conditions. The method depends on the fact that the variations appearing when the organism loses much fluid through sweating are removed through simultaneous intake of water and common salt.

The investigation was begun in the rolling mill of the iron works of Serp u. Molot in Moscow. A continuous observation has shown that the workman in the course of a six-hour working day drinks up to 8 liters of water and the weight loss approaches 5.5 kg. The water balance of the organism always remains definitely negative and approximates 4 kg. It was suggested to

the workmen that a 0.75 per cent. common salt solution should be placed near the water conduit to be taken, and this they gladly agreed to. The mixtures of common salt and water to be drunk were not determined but it was left to the workmen to drink what they pleased.

The results of the research have shown that when the common salt mixture introduced into the organism was adequate, the weight loss was diminished and the negative water balance reached only insignificant values. In addition the sensation of thirst was lessened; the workmen afterward indicated that their own condition on ingesting common salt was considerably improved.

The writer concludes that the workmen in hot trades should be supplied with a 0.75 per cent. common salt solution near the drinking water. The dosages can by no means be determined in advance since in each individual case they must correspond to the salt loss occurring in sweating; therefore it is advisable that it be left to the workmen to take the salt solution according to their desire.—A. M.

SEATS FOR WORKERS IN FACTORIES AND WORKSHOPS. *Welfare Pamphlet No. 6, pp. 39. Second edition. H. M. Stationery Office, 1932.*

This useful pamphlet, which was originally published in 1920, has now a second edition, in which opportunity has been taken to bring it up to date. The pamphlet directs attention to the importance of seats for workers, and presents a short summary of information and experience gathered on the subject by inspectors of factories; it indicates how a difficulty sometimes met with can be overcome. Strain is caused by prolonged standing at work, which makes it important that seats be provided to enable the workers to sit where practicable; or, where work cannot be done sitting, to take advantage of opportunities for resting during intervals at work. In Great Britain the provision of seats is required in certain industries, which undoubtedly prevents unnecessary fatigue and promotes efficiency. Progressive firms are alive to the advantages gained; but sufficient attention is not always paid to the subject. The pamphlet is well and usefully illustrated.—E. L. C.

HAZARDS OF COMPRESSED AIR, DIMINISHED PRESSURE, GENERATION AND USE OF ELECTRICITY, AND ELECTRICAL WELDING

HYGIENIC PROBLEMS OF REDUCED AIR PRESSURE. *F. Koelsch. Jour. State Med., March, 1932, vol. 40, pp. 160–171.*

Information concerning the reaction of the body to reduced air pressure has been assembled excellently in this article, which deals with climbing or being carried into high mountainous regions, with ascent by balloon or by airplane. Three zones are important: up to 6,500 feet, between that height and 16,500 feet, and above 16,500 feet. Ordinary flying heights are in the first zone. Prolonged residence in high altitudes leads to an increase in the number of red corpuscles and their hemoglobin content; thus the red corpuscles per cubic centimeter may rise from a normal of 4,500,000 to 6,500,000. Repeated sojourn at great heights, *e.g.*, by flyers, also leads to

polycythemia. Ascent by mountain railways should not be too rapid; twenty or thirty minutes should elapse in ascending 2,500 feet.

The first effect of reduced pressure is increased excitability; then, as the oxygen in the atmosphere becomes impoverished, excitability is replaced by depression, until finally judgment becomes affected. The eye maintains space orientation; hence in dense fog this becomes impossible, even when flying upside down. Details are given of physiologic reactions affecting respiration, the activity of the heart, and metabolism; the last named is affected by the amount of oxygen in the blood. Although a series of symptoms have been ascribed to airplane sickness, no characteristic occupational air pilot sickness can be clearly defined. After a crash a definite psychologic reaction may follow; such reaction becomes faint when flying is again taken up; hence the victim of an accident should fly again as soon as possible. Cold and wind are important factors, as at great altitudes the temperature may drop to −22° to −76°F. Probably the limit of existence is about an altitude of 42,000 feet. While a sound heart can cope with the extra work at high altitudes, persons with even slight heart disorders, increased blood pressure, or arteriosclerosis are unsuitable even as passengers.—E. L. C.

SPIRAL FORM OF MUSCLE FIBERS AFTER ELECTRIC SHOCK: THEIR HISTOLOGY. *S. Jellinek. Abstr. as follows from Wien. klin. Wchnschr., Jan. 8, 1932, vol. 45, p. 37, in Jour. Am. Med. Assn., April 2, 1932, vol. 98, pp. 1233–1234.*

Jellinek relates his observations on the muscles of two men who had died as the result of an electric shock. Microscopic examination of the individual muscle fiber revealed characteristic morphologic changes. The fiber appears as a sharply defined spiral formation, which, in the regularity of its construction, resembles a screw bolt. The author gives a detailed description of the microscopic aspects and also reproduces a photomicrograph that shows the muscle fiber magnified 760 times. He also attempted to produce these changes in guinea-pigs by exposing them to electric current of high tension and he found the same spiral forms, but he points out that they develop only after exposure to an alternating current. A direct current of high voltage did not produce this phenomenon. In the conclusion the author points out that the morphologic changes of the muscle fibers are significant not only because this structural change of an organic substance has hitherto not been noticed but also because they evidently represent a purely electro-energetic effect, which is not only significant for electropathology but may be a guide in the investigations into the primary causes of the biologic field and ray action. —C. K. D.

INDUSTRIAL ENVIRONMENTAL CONDITIONS

FACTORY CONSTRUCTION. *M. Hahn, K. B. Eisenberg, E. Emele, and H. Poelzig. Beihefte z. Zentralbl. f. Gewerbehyg., no. 18, 1930, pp. 40.*

The subject of factory construction is treated from three different standpoints: that of the physician, that of the factory inspector, and that of the

architect. Each covers a wide range of problems which are discussed in detail.

ULTRAVIOLET EQUIPMENTS AND THEIR APPLICATIONS. *L. C. Porter, C. E. Egeler, and W. Sturrock. Tr. Illumin. Engin. Soc., Jan., 1932, vol. 27, pp. 23-61.*

The authors describe the latest sources of ultraviolet radiation, and discuss the design and installation of equipment for these sources. Valuable data, both practical and theoretical are presented. The charts, tables, and cuts are unusually good.—P. D.

AIR CONDITIONS AND THE COMFORT OF WORKERS. *Metropolitan Life Insurance Co., Indust. Health Series no. 5, pp. 20.*

This booklet contains a popular report describing simple methods for measuring temperature, humidity, and air motion, and tells how air is conditioned for comfort and health.—C. P. Y.

VASOMOTOR REACTIONS TO LOCALIZED DRAFTS. *C.-E. A. Winslow and L. Greenburg. Am. Jour. Hyg., Jan., 1932, vol. 15, pp. 1-35.*

The popular belief that localized drafts on the feet or head are more serious than chilling the whole body, found little confirmation in this interesting series of observations. In so far as vasomotor reactions were concerned, nothing was found to indicate that the action of localized drafts differs from that of uniform chilling of the body in such a way as to imply a special influence on susceptibility to respiratory infections. In spite of the rigorous chilling (minimum temperature, 47°F., maximum air movement, 1,700 feet per minute) to which the subjects were exposed, only one of the seven subjects developed a cold.

Localized drafts on the head or feet, with the rest of the body at a higher temperature, produced a less marked fall in the temperature of the exposed parts and of the nasal mucosa and less vasoconstriction in the mucous membranes than did exposure of the entire body to the chilling influence. Chilling of the feet produced a definite dilatation of the blood vessels of the nose and throat and an appreciable rise in the temperature of the nasal mucosa. The changes in the nasopharynx, tonsils, and oral mucosa in response to chilling were less significant than those in the nasal mucosa.

The authors conclude that their work does not confirm the general belief that chilling of the feet is especially harmful.—C. P. Y.

INFRA-RED RAYS AND VENTILATION. *L. Hill. Jour. Physiol., Jan. 14, 1932, vol. 74, Soc. Proc., p. 1.*

The author finds that long infra-red rays falling on the skin of the face or body excite a congestion of the nasal mucous membrane which narrows the airway. Cooling the irradiated part, *e.g.*, by fanning, prevents the reflex effect. Rays from a bright source, giving a sufficiency of red and short infra-red rays, antagonize the action of the long infra-red rays. This antagonistic action can be provoked from any part of the skin. The reflex could be provoked in a sensitive subject even at a distance of 47.5 feet when the subject was facing an electric fire in a well-ventilated room. Water vapor screens off the long infra-red rays; hence the efficacy of a bowl of water placed in front of a dark or dull red source of heat.—T. B.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

A Survey of Personnel Management in 195 Concerns. *S. B. Mathewson. Personnel Jour., Dec., 1931, vol. 10, pp. 225–231.*

Questionnaires describing personnel practices were returned by 195 leading concerns employing 2,391,000 workers. It was found that man analyses are more common than job analyses. Psychologic tests have lagged behind trade tests as an employment device. Interviewing is the most generally used employment device, being reported by 93 per cent. of the concerns. Some sort of job training is given by 92 per cent. Bonus plans of wage payment are used by relatively few employers in comparison with straight piece rates, and straight time is still used by 69 per cent. Pension systems are in use two and one-half times as often as employee representation. The proportions of firms using various combinations of personnel management devices are also shown, and many other valuable comparisons are made.

The Social Aspects of Rationalisation. *Internat. Labour Office, Introductory Series, Studies and Rep., Series B (Economic Conditions) No. 18, 1931, pp. 381.*

The International Labour Office has done good service in issuing this study. In it is brought together a mass of information collected from all corners of the world, bearing upon recent investigations into the modern organization of industry. Rationalization is held to be the fruit of patient industrial study, which aims at the optimum adjustment of means to ends, thus securing that every effort produces the maximum useful results. The seed of this movement, which is now world wide, was sown in America when Taylor introduced scientific management. It has spread widely since then, and the present volume deals with scientific management methods in relation to the human factor and conditions of work, and with the research which is being carried out into these methods.

Here special attention is paid to the studies of the Industrial Health Research Board of Great Britain, particularly with regard to the investigations made into hours of work and the use of rest pauses. Evidence as to the effects of the reduction of hours of work on production is given at some length, since it is an important aspect of rationalization. Similarly, consideration is given to the various methods of wage payment, and their influence as an incentive to activity. Less regard is had to industrial hygiene, possibly because it has been less studied rather than that its influence is less appreciated by the writers. Certainly the influence of the human factor in the occurrence of accidents is presented not inadequately, and the conclusions are finally drawn that there is a limit in organizing the technic of production. This limit cannot be overstepped with advantage, since the nature of man is a living and changing complex, with individual peculiarities, which cannot be bound down within too strict limits. Hence output, if it is to be harmless to the workers' health, must be fixed at an optimum, rather than a maximum, and some harmonious compromise must be established between the interests of production and the needs

of human nature. Here the factory doctor and physiologist must be called in to help the technical expert. —E. L. C.

SOME PERSONAL FACTORS IN INDUSTRIAL EFFICIENCY. *S. Wyatt. Human Factor, Jan., 1932, vol. 6, pp. 2–11.*

Piece rates are usually preferable to time rates, as the inclination to work is strengthened and susceptibility to boredom is correspondingly reduced. The output is generally increased by 10 to 50 per cent., and though the increase of speed may in some cases decrease accuracy, time rates are apt to increase it more, as they induce indifference and inattention. Another variant of a system of payment by results is provided by opportunities for promotion. Such opportunities may be infrequent, but even in machine feeding operations the machines can sometimes be arranged in small groups so that the speeds, and consequently the possible rates of working, form a graded series. As soon as a worker in any group attains a specified level of efficiency she is promoted to the next higher group, and so on.

Under modern industrial conditions more output is lost through boredom than through fatigue. Yet the causes and effects of boredom, and its remedies, have received very little consideration. Boredom can be reduced by diverting the mind from the unpleasant aspects of work by means of rest pauses, changes in the form of activity, allowing the operatives to talk and sing, etc. Output is also affected by the reaction of workers to one another. Slow workers are apt to reduce the speed of the quicker workers, and as far as possible they should be grouped together, and be separated from the quick workers. The output of piece rate workers is adversely affected when the conditions of work offer obstructions. Enforced idleness, due to lack of supplies because of faulty organization, may be followed by increased fluctuations in the rate of working, due to emotional disturbances. The workers, if dissatisfied, should be encouraged to express their grievances to a sympathetic member of the staff.—H. M. V.

TIME EXPERIMENTS ON HOEING. *N. Balchin. Human Factor, Jan., 1932, vol. 6, pp. 12–25.*

Observations were made on four men engaged in hoeing a field of kale. The number of yards hoed was estimated every fifteen minutes, and it was found that with three of the men the speed rose to a maximum in the first hour, and then dwindled to about half the maximum rate. The fourth worker, however, kept a fairly steady rate, and attained a better total of work. When an observer was present the speed of work increased 80 per cent., and obviously the slow rate of work was due to boredom rather than to fatigue. There was not much slowing of the essential muscular movements, but the number of pauses taken increased greatly, the total time lost being twenty times greater at the end of the morning than at the beginning. When the men were offered a bonus their speed of work nearly doubled, though they were not unduly fatigued. —H. M. V.

THE STANDARDS OF VISION DEMANDED OF INDUSTRIAL WORKERS.

M. Menacho. Abstr. as follows from Arch. de oftal. hispano-am., March, 1931, vol. 31, p. 135, in Am. Jour. Ophth., Jan., 1932, vol. 15, pp. 92–93.

Our technical progress is making vocational guidance imperative, and vision plays a considerable rôle in the selection of industrial workers. Color vision is stressed disproportionately in connection with certain industries and other visual functions neglected, to the detriment of workers and of the requirements of industries. While errors of refraction can be corrected, many transport workers find glasses an inconvenience, and aviators cannot use them at all. Defective binocular vision makes the learning of certain trades, even under the most favorable conditions of adaptation, impossible in less than a year, and it is a serious handicap to many transport workers. Normal visual fields should be insisted on in transport workers. While color vision cannot be acquired by education when congenitally absent, De Mets reported that the fifty-one Belgian railway employees who were found color blind on a reexamination of 8,000 workers had never met with an accident. The fact that in the Lyon silk industry region a higher grade of color vision is found than elsewhere points to the possibility that dealing with colors sharpens considerably the corresponding sense. The author would retain the present rigorous requirements in the matter of color vision for aviators and mariners, but would relax the requirements for railway employees. To make it safer he suggests a combination of illuminated form and color signals, the abandonment of red and green colors, and utilization of the more visible yellow color, so that even color blind persons would not be confused.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

Occupational Disease Legislation in the United States. *F. Perkins. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 199–204, in Bull. Hyg., Dec., 1931, vol. 6, pp. 856-857.*

Each state of the union is independent of the federal government in workmen's compensation legislation almost as much as each nation in Europe. In regard to Workmen's Compensation Acts there is a tendency in all to widen the scope and to increase the number of compensable diseases.

The preliminary report of the recently appointed State Health Commission of New York, issued February 16, 1931, recommends that "the present limited schedule of occupational disease be extended to include any disease arising out of employment and that the Industrial Board be given authority to make awards in case of such occupational diseases when it is established that the particular disability in fact arose out of the employment."

The principal differences in regard to industrial diseases under the Workmen's Compensation Acts may be classified as follows:

1. Laws which specify occupational diseases: (*a*) by schedule; (*b*) by schedule when occurring in specified

processes; (*c*) those which have no schedule either of disease or of process.

2. Laws which *permit* compensation for occupational diseases "arising out of and in the course of employment" by a liberal interpretation of the law.

3. Laws which exclude diseases unless they result from an accidental injury.

Although some of the laws exclude or limit occupational diseases, yet the practice is to interpret the laws liberally and therefore many occupational diseases are paid for as accidents. Those laws which specify certain diseases sometimes exclude cases that are clearly occupational, while other laws, general in terms, create a legal battle ground in which cases are sometimes admitted and sometimes excluded from compensation.

The following is a résumé together with an analysis of the status with respect to occupational diseases:

States having compensation laws:

1. From which occupational diseases have been specifically excluded, except as the result of an accident. This includes thirty-one states.

2. Including occupational diseases by implication: Massachusetts, Maryland, North Dakota, Michigan, and Texas. In the last two, occupational diseases have been ruled out but are included in California, Connecticut, North Dakota, and Wisconsin.

3. Including only diseases specifically listed.

The number of diseases scheduled varies from three in Illinois to twenty-seven in New York.—T. M. L.

NEW LIGHT ON WORKMEN'S COMPENSATION: THE GERMAN CODE. *T. M. Legge. Brit. Med. Jour., Jan. 16, 1932, vol. 1, pp. 112–113.*

Interesting details are given as to the way in which industrial diseases are today compensated in Germany. No compensation is paid during the first twenty-six weeks of sickness, during which period the sickness insurance law entitles the workers to sick pay, and medical and surgical treatment. After that period, if the disease has been scheduled, compensation is paid. The method of scheduling diseases is similar to that followed under the British Workmen's Compensation Act; but in the latter case compensation is paid from the commencement of the illness, the claimant not being eligible for benefits under the National Health Insurance.

A list is given of the number of reported cases and of the claims arising among these cases. Neither total can be accurately compared with British compensation statistics. Nevertheless, interest attaches to the large number of cases reported, which amounted to 3,456 for lead poisoning in the year 1929, as compared with 244 in Great Britain. Possibly silicosis, on account of its chronic character, should provide a better instance, were it not that in Great Britain the scope of the Act has quite recently been made much more widely applicable; in Germany in 1929 there were 1,209 cases awarded compensation, while in Great Britain barely fifty new cases were recorded. The probability is that this disease will stand out easily at the head of our compensation list, just as it does today in Germany. The German scheduled list does not include illnesses which seldom, if ever, incapacitate for as long as twenty-six weeks, for reasons stated above; hence such conditions as miners' beat hand and beat knee

are not included. On the other hand, deafness in metal work and diseases from the dust of basic slag, as well as infectious diseases among public health workers, are all included, and the author suggests that the British scheduled list be overhauled, so as to include certain of these other complaints. Another interesting group in the German list is disease of muscles, bones, and joints from using pneumatic drills, which are held to originate Raynaud's disease, which has not received study and recognition in other countries.—E. L. C.

THE HEALTH OF THE INDUSTRIAL WORKER (FROM THE VIEWPOINT OF COMPENSATION DISEASES). *E. L. Collis. Jour. State Med., Feb., 1932, vol. 40, pp. 96–105.* (*Abstract by author.*)

After sketching the advantages which were associated with the rise of modern methods of production, a review is given of the action of compensation law in Great Britain, particularly with regard to industrial diseases. Here, out of the eight industrial diseases standing at the head of the compensation claims, five are found to be the monopoly of coal miners, *i.e.*, miners' nystagmus, beat knee, beat hand (which lead the list in this order), and beat elbow and synovitis of the wrist (which stand fifth and sixth). Attention is drawn to the way in which miners similarly claim a high percentage of accidents; the miners comprise only 12.5 per cent. of the total workers at risk, but they account for 42 per cent. of the accident claims; while every year 23 per cent. of the coal miners have cases for compensation, for factory workers the percentage is only 3.8. A group of compensation cases which has come to the fore in recent years includes epitheliomatous ulceration. Its importance is due largely to the cases occurring among cotton spinners, which originate from mineral oil. The most recent disease to which the provisions of the Act have been opened is silicosis, of which the widespread nature and extent can only be fully known as the provisions of the Act are more understood.

LEGAL PHASES OF INDUSTRIAL OPHTHALMOLOGY. *S. Walker. Am. Jour. Ophth., March, 1932, vol. 15, pp. 228–230.*

"Many of the problems to be considered in handling industrial eye injuries are discussed. The need for accuracy and completeness of records is emphasized. Differentiation between results of the injury and preexisting conditions is an important point. Before the industrial commission testimony should be simple, direct and based on proper records."

IMPAIRMENT OF VISION FOLLOWING HEAD INJURY. *A. E. Smith. Minnesota Med., Sept., 1931, vol. 14, pp. 809–819.*

About 75 per cent. of persons who have sustained head injuries of any consequence complain afterward of visual disturbances. These may comprise anything from a slight, transient obscuration of sight to complete blindness. These sequelae frequently form the basis for claims for compensation or damages.

Injury to the visual mechanism manifests itself in various ways: (1) impairment of central vision; (2) defects in the peripheral fields of vision; (3) impairment or loss of func-

tion of the cortical centers or association fibers, causing conceptual blindness in which the patient can see objects, but fails to recognize them for what they are; (4) loss of ability to distinguish colors; (5) motor derangements; (6) nystagmus; and (7) purely psychic affections of the sight, such as occur in hysteria, traumatic neurasthenia, etc.

The author's discussion should be of interest to physicians involved in settling claims for compensation or damages.

REHABILITATION OF DISABLED EMPLOYEES

THE END OF CONVALESCENCE—THE JOB. *F. Rivkin. Abstr. as follows from Hosp. Social Service, May, 1931, vol. 23, p. 518, in Occup. Therap., Aug., 1931, vol. 10, p. 270.*

A well-rounded program of convalescence is hardly complete until the patient has been readjusted to his daily job. The real test of the patient's recovery is his physical and mental ability to go back to his work. Brief case reports are given to show the evil effects of returning patients to industry before recovery has been established and the various steps undertaken to investigate cases are described.

"The ideal solution is, of course, a workshop with adjustable hours and tasks, where the patient can gradually be brought back to his full working capacity. We have found that it is practically impossible to find employers in industry who are willing to sacrifice their profits to permit this to be done in their factories. The few people that we get who have been prepared for work have little difficulty in being reabsorbed in industry, and we do not feel too hopeful, I am sure, when we look forward to a time when the handicapped person who is capable of being trained will have the same opportunities as a normal worker, and when he can fill a skilled job he will be a highly productive part of the industrial world."

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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GENERAL

REPORT OF THE MEDICAL OFFICER OF INDUSTRIAL HYGIENE FOR THE YEAR ENDED 31ST DECEMBER, 1930. *C. Badham. Rep. Dir.-Gen. Pub. Health, New South Wales, for 1930, Section I.-E, Indust. Hyg., pp. 66–70. Sydney, 1931.*

The author first refers to the International Silicosis Conference which he attended at Johannesburg. He then tells of an inquiry among New South Wales coal miners, which resulted in the discovery of a fine type of fibrosis of the lung, found in 26 per cent. of the men. The investigation revealed the existence of fibrosis of the lungs among these men, of which the onset is slower and the disability less marked than from fibrosis among metalliferous miners. The condition is being further investigated. Among other investigations the occurrence of dermatitis is recorded among laborers employed in the ships' hold and on the wharves working a cargo of bagged soda ash. The typical lesion was a superficial ulcer over the dorsum of the metacarpal of the left thumb and forefinger, caused by rubbing against the bag of ash when pulling it by the ear

with the left hand. A further investigation concerned dust arising from loading bulk wheat from the silos into ships' holds. Discomfort from inhaling the irritant dust in the holds is marked; the dust consisted of vegetable hairs and cells, starch grains, and fungus spores. The irritation may be due to the numerous fine hairs. No evidence is at hand that this dust aggravates existing tuberculosis, or incites a quiescent condition.—E. L. C.

INVESTIGATIONS INTO INDUSTRIAL HYGIENE. *Teleky. Abstr. as follows from Deutsch. med. Wchnschr., 1931, vol. 57, pp. 1205–1206; pp. 1246–1247, in Bull. Hyg., Jan., 1932, vol. 7, p. 18.*

In the first part the author describes the process of cleaning feathers from feather beds, stating that originally they come from Poland, Hungary, Russia, and China contaminated by a great deal of dirt. They are prepared for sale (1) in large bedfeather cleaning establishments, and (2) in small premises associated with various other subsidiary household services, such as carpet cleaning, upholstering, etc. The author carried out experiments as to the extent to which disinfection was effected in the apparatus under a pressure of 0.8 to 2.5 atmospheres, in which the feathers remained for some ten to twenty minutes. During the ordinary run of the process, temperatures between 78° and 98°C. were reached and occasionally about 100°C. That there was no question of real disinfection was proved by subsequent tests made on so-called disinfected feathers.

In the smaller installations temperatures varied from 39° to 66°C. The author points out that for feathers used in old feather beds the temperature reached may destroy sensitive Spirochaeta pallida and gonococci but would not destroy the virus of scarlet fever, or typhoid or tubercle bacilli.

In the second paper the author discusses the connection between close work and oncoming myopia and holds that as a result of the examination of several workpeople the connection is established, but in comparatively late life only.

He also recounts briefly the elucidation of the subject of injuries from pneumatic drills by Dr. Maria Seyring (see THIS JOUR., 1931, vol. 13, p. 21). Further, he relates two cases of severe silicosis induced in as short a time as two years in sandblasting operations. Finally, he summarizes the results of an inquiry made into the effect of factory work on women and the maternal function. He concludes that the death rate of infants is definitely higher among women who remain at their employment in the last weeks as compared with those who cease work some time before. Further, the mortality of infants is greater among women who return to work shortly after childbirth than among those who remain away some time.—T. M. L.

ELECTRIC LIGHT AND POWER INDUSTRY. *Abstr. as follows from Industry Rep., Jan., 1932, vol. 7, pp. 1–10, in Personnel Jour., April, 1932, vol. 10, p. 435.*

All jobs are described, from that of the ash handler to the plant superintendent, and the hazards associated with each are listed. "Conditions in individual plants" gives one an idea of the number of workers needed for the different jobs, the personnel activi-

ties in the selected plants, and the range of wages paid.

TANNING. *Abstr. as follows from Industry Rep., Dec., 1931, vol. 6, pp. 145–161, in Personnel Jour., April, 1932, vol. 10, p. 435.*

All jobs in the industry are classified according to department, and for each job the duties of the worker are outlined, as well as the chief hazards to which the worker is exposed. The health hazards of the industry as a whole are described by Dr. C. P. McCord. Although the descriptions of the jobs are brief, enough information is given throughout the article to make it valuable for placement workers or those interested in vocational guidance work.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

THE MOUSE AS AN INDICATOR OF CARCINOGENIC AGENTS IN INDUSTRIAL PLANTS AND DWELLINGS. *Teutschlaender. Abstr. as follows from Fortschr. d. Med., 1931, vol. 49, p. 575, in Am. Jour. Cancer, March, 1932, vol. 16, p. 298.*

This is essentially similar to an earlier article by the same author (*Deutsch. med. Wchnschr.*, 1930, vol. 56, p. 2166; for abstract see THIS JOUR., 1932, vol. 14, p. 1). He suggests the use of mice as indicators for the presence of carcinogenic agents in those industries where they are apt to be encountered (pitch, etc.) as well as in so-called cancer houses.

INCREASE OF LUNG CANCER AND DISEASE DUE TO DUST INHALATION. *W. Berblinger. Abstr. as follows from Med. Klin., 1931, vol. 27, pp. 1337–1342, in Bull. Hyg., Jan., 1932, vol. 7, pp. 46–47.*

The author remarks that an effective means of early diagnosis of malignant disease is greatly needed and refers, not too optimistically, to the methods of Freund and Kaminer and Kahn. Passing to the subject of cancer of the lungs, he says that discussion must be based only on histologically verified cases, and that a distinction between bronchial and pulmonary forms is impracticable although he would separate extensions from the pleura. He adopts Kaufmann's classification into three types: (1) a tumor originating in the bronchial wall near the hilum; (2) a diffuse infiltrating form which is rarer; (3) a form characterized by more or less sharply circumscribed soft nodules in the lung tissue. The diagnostic signs and symptoms are then discussed.

The paper is based upon eighty-two cases—sixty-nine in men, and thirteen in women. Of these, forty-six were correctly diagnosed on clinical grounds. The author gives a complete tabulation of his data, showing total number of autopsies, number within the cancer age, number of cases of cancer, number of cases of cancer of the lungs, age distribution (eight age groups) separately for the years 1910 to 1931. He mentions his previously published opinion that the great epidemic of influenza of 1918 to 1919 might be partly responsible for the increase in cancer of the lungs, remarking that this has not found universal accept-

ance. An alternative explanation, *i.e.*, injury to the lungs through dust inhalation, is not supported by the author's observations. Silicosis is common in Jena owing to the extensive pottery industry of Thuringia but the author has never found silicosis in combination with malignant disease of the lung; fifty of the cases were studied with great care from the point of view of estimating the amount of pneumonokoniosis, but only a few exhibited any notable degree of chalicosis or anthracosis, and quartz dust was never found. The author refers to other hypotheses, *e.g.*, the effect of tarring the roads, as worthy of consideration but unproved. He notes that only once in the series of eighty-two cases was pulmonary tuberculosis coincident with malignant disease of the lung.—M. G.

THE HEART PROBLEM OF THE WORKER. *C. P. McCord. Read at the 41st Annual Meeting of the Association of Life Insurance Medical Directors of America, Oct. 23–24, 1930. New York, 1931, pp. 28. Abstr. as follows in Bull. Hyg., Jan., 1932, vol. 7, p. 47.*

The findings are presented, in ten detailed tables, of clinical investigations as to cardiac conditions in various types of employment. Three groups are considered: (*a*) male office workers, (*b*) male factory workers, employed on machine and hand tools, and (*c*) male train dispatchers. Group (*a*) represents essentially sedentary work without physical effort; group (*b*) represents physical work without mental strain; the work of group (*c*) calls for explanation. A train dispatcher sits, maybe for eight hours on end, with a telephone receiver over his ear, taking as many as 200 items an hour for record or decision; many records involve life and death; he is the spearhead in all train movements, and carries the burden of safety of the traveling public. Train dispatchers were found with a 67 per cent. incidence of occupational nystagmus, and a 52 per cent. incidence of occupational deafness, largely in the phone ear, and also with a high incidence of telegraphist's paralysis among older men who used to operate Morse instruments.

Interest for the present report centers in an extraordinarily high incidence of cardiovascular abnormalities among this same group, which reached 81.8 per cent. as against 36.1 for office workers, and 31 for factory workers. All the clinical examinations were carried out by the same physician, so the personal element in deciding upon a standard to adopt for abnormalities should be discounted. Considering the great stress placed in the past upon physical effort as a factor in cardiac strain, the conclusion drawn is unexpected; *viz.*, organic cardiovascular abnormalities result from prolonged, overwhelming mental strain, which means that organic impairment may result from mental trauma. [Considering the importance of the conclusion reached, a more detailed discussion of the data embodied in the tables should have been presented.]—E. L. C.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

APPARATUS FOR CALIBRATION OF FLOWMETERS. *G. W. Smith. Indust. and Engin. Chem., Analyt. Ed., April 15, 1932, vol. 4, pp. 244–245.*

A simple water displacement method is described. It is intended for small meters with low rates of gas flow.—P. D.

A NEW RESPIRATORY APPARATUS FOR USE IN MINES. *H. Briggs. Tr. Inst. Min. Eng., 1932, vol. 82, p. 386.*

A new respiratory apparatus is described which is somewhat analogous to a diver's outfit, except that there is no helmet. The stream of air is obtained from a pump. The air is under pressure (from 4 to 8 pounds) and the tube is a stout-walled, highly flexible pipe without wire reenforcement. The apparatus has advantages over the smoke helmet and equalizer, which are commonly used, in that: (1) the tube is not easily cut or flattened by a tub wheel or falling stone; (2) flattening, when it does occur, is not permanent; (3) the tube is easily manipulated and does not kink readily; (4) there is no helmet to restrict vision and hearing; and (5) the tube weighs only about one-third of a similar length of the wired hose commonly used.—T. B.

A CLINICAL SURVEY OF POISONING BY ARSENIURETTED HYDROGEN GAS. *B. Kogan. Abstr. as follows from Arch. f. exper. Path. u. Pharmakol., 1931, vol. 161, pp. 310–324, in Bull. Hyg., Feb., 1932, vol. 7, p. 85.*

The author describes in detail two cases in men working together, filling toy balloons with hydrogen formed through the action of sulphuric acid on zinc. The acid was not of the usual kind and as the gas collected failed to cause the balloons to rise, all of it was allowed to escape into a room in which eight persons were working. The same evening two men felt ill, vomited, and passed bloody urine.

Both came under the observation of Kogan five days later. Skin and sclerotics were of an icteric, or rather sunburned, color. There was no loss of consciousness. Examination of the blood showed: hemoglobin 38 per cent. and 30 per cent.; red blood cells 1,170,000 and 1,075,000; color indexes 1.7 and 1.5; marked polychromasia; vital, stippled red blood cells thirty and twenty-five per thousand. The serum was yellowish brown with hematin present, but no bilirubin.

Both cases improved after the tenth day. The jaundice disappeared on the thirtieth and the twenty-fifth days; urine was normal in fifteen and twelve days, respectively.

The author discusses especially the production of hematin and methemoglobin in the serum in both and the presence of bilirubin in the urine in excess in one in the light of his own and of other recorded cases of arseniuretted hydrogen poisoning. The sunburn-like tinge of the skin he attributes to the hematin in the serum and the increased excretion of urobilin in the urine to the activity of the liver following on absorption of the hemolytic poison.—T. M. L.

EXPERIMENTAL BENZOL POISONING. *T. Muto. Jour. Oriental Med., Nov., 1931, vol. 15, pp. 97–98.*

The author has followed the hematologic and pathologic changes produced in animals experimentally poisoned with benzene. Ten days after injection of benzene rabbits showed a diminished leukocyte count. The chief characteristic is a decrease in pseudoeosinophils and lymphocytes. The red cells are not so markedly affected. The spleen shows follicular atrophy and the lymph glands show a generalized destruction. In other organs a condition of stasis is apparent, with low grade parenchymatous degeneration.—L. T. F.

CARBON TETRACHLORIDE POISONING. REPORT OF CASES. *F. H. Haigler. Abstr. from U. S. Nav. Med. Bull., 1931, vol. 30, pp. 137–139, in Bull. Hyg., April, 1932, vol. 7, p. 255.*

The cases recorded in this paper occurred on board a vessel carrying tins of carbon tetrachloride, which were stored in a poorly ventilated compartment. Some of the containers were rusty and later began to leak. A party of five men was sent to remove them, and from 2 to 3 quarts were spilled. Within five minutes two men collapsed, and the other three also became anesthetized when trying to rescue them. All recovered soon when placed in the air, except for weakness, nausea, and somnolence, lasting in two patients for some hours.—H. H. S.

LEAD ENCEPHALOPATHY WITH RECOVERY: CASE. *K. Rothschild. Jour. Nervous and Mental Dis., March, 1932, vol. 75, p. 263.*

FATAL FIBROSIS OF THE LUNG FROM INDUSTRIAL USE OF RADIUM. *F. Doenecke. Ztschr. f. Path., 1931, vol. 42, p. 161.*

Idem. T. H. Belt. Ibid., p. 170.

Abstracted as follows in Am. Jour. Cancer, March, 1932, vol. 16, pp. 309–310.

Wintz (Die Roentgenbestrahlung des Mammacarcinoms, Leipzig, Thieme, 1924) described in detail the changes in the lungs after radiation therapy and presented a number of cases of induration of the lungs observed after the radiation treatment of cancer of the breast. Clinically these changes were manifest by the development of a dry and nonproductive cough. Percussion at first was normal and auscultation showed only a few high-pitched râles. At this stage X-ray examination of the chest showed no definite changes. As the fibrosis progressed, râles became more numerous and there were marked shadows in the roentgenograms. The subjective symptoms increased in severity and patients complained of dyspnea, palpitation, and pain. The majority of Wintz' patients did not succumb to this process. Particularly unfavorable was the combination of this fibrosis with infections such as bronchitis, grip, or pneumonia. In one case of carcinoma of the right breast an autopsy showed an almost complete hepatization of the radiated right lung. In many cases the alveoli were completely obliterated by thick connective tissue. Residual carcinoma could not be demonstrated.

Doenecke reports the clinical history of a chemist who worked with radium and closely related elements, such as mesothorium and radiothorium, from 1926 to 1930. The symptoms pre-

sented were mostly pulmonary and the clinical differential diagnosis between tuberculosis and new growth could not be made.

The autopsy findings in this case are discussed in full by Belt. The striking feature was the absence of tuberculosis or tumor of the lungs, and an almost complete fibrosis of these organs. The latter was so complete that crepitation was difficult to obtain. Excellent photomicrographs illustrate the extent of this fibrosis. The causes of fibrosis of the lung are discussed in detail, and the conclusion is drawn that although definite proof was lacking in this case it was highly probable that the fibrosis was a direct result of radiation.

INJURY THROUGH SANGAJ OIL AS A CAUSE OF MYELOID LEUKEMIA. *A. Brandt. Abstr. as follows from Zentralbl. f. Gewerbehyg., Oct., 1931, N. S. vol. 8, pp. 250–253, in Bull. Hyg., Feb., 1932, vol. 7, p. 85.*

A turpentine substitute is in frequent use now, distilled from East Asiatic mineral oil under the name of terapin, which consists of 80 per cent. saturated and 6 per cent. aromatic hydrocarbons. The author describes its use on a large scale in printing works for cleaning the cylinders. The death of one workman from leukemia led to examination of some twenty printers and their helpers. All complained of loss of appetite, depression, vomiting, and colic; nystagmus was present in all with one exception. Nearly one-half of the cases had hemorrhages from the gums. In the fatal case, the examination of the blood showed leukopenia and marked myeloid rather than lymphatic leukemia. In the bone marrow no fully grown granulocytes were found but only early forms, such as myeloblasts. Changes analogous to the foregoing but less severe were found in the blood examination of the other workers.—T. M. L.

TUMOURS OF THE SKIN PRODUCED BY BLAST-FURNACE TAR. *G. M. Bonser. Lancet, April 9, 1932, vol. 1, pp. 775–776.*

Details are given of an inquiry in which blast furnace tar was used experimentally to produce skin lesions in mice. The results indicate that blast furnace tar can produce malignant tumors; it is less active than gas tar; but its carcinogenic properties can be enhanced by extraction with ether. Workers at iron works do not handle tar in the same way as men manipulating gas tar, pitch, and paraffin; moreover, the yield of tar is small, and blast furnace tar is regarded as a waste product and so is disposed of. Further, blast furnace tar is not a potent carcinogenic agent. These reasons explain the absence of epitheliomatous ulceration in blast furnace tar workers; but this tar would probably be carcinogenic for man as well as for mice, given the right conditions for its contact with the skin.—E. L. C.

ACCIDENT AND HEALTH RISKS IN COAL TAR DISTILLATION, WITH SOME SUGGESTIONS FOR THEIR PREVENTION. *H. Leymann. Schrift. a. d. Gesamtgeb. d. Gewerbehyg., no. 38, 1932, pp. 39. Abstr. as follows in Bull. Hyg., March, 1932, vol. 7, pp. 151–152.*

In this, the thirty-eighth brochure of the Association of Industrial Hygiene, Dr. Leymann discusses from German

Factory Inspectors' and other reports the commoner causes of mishaps.

After a brief account of the preparation of tar and tar derivatives, he presents tables giving the number of persons employed in the chemical industry and in two of its branches (one of them coal tar and coal tar derivatives, but excluding aniline and its preparation), showing that of 401,659 persons employed in all chemical works in Germany in 1929, 6,068 were employed in tar distillation. Cases and deaths for various forms of accidents are given. The need for this report is shown by the increased incidence from fire risk, corrosive substances, and poisonous gases, as compared with the others considered. Limiting himself to the risks in coal tar distillation, Dr. Leymann discusses these in relation to accidents arising from fracture or bursting of stills; blocking of valves; incautious opening of stopped-up taps to allow pitch or hot tar to escape; spurting out of hot tar when water or damp vapor gets into the containers; the tar oils or gases catching alight; burning of heated oils; overflow or escape from containers of oils, etc., the material subsequently catching fire; bursting or overpressure of tar or tar oils; fires and explosions of tar oils resulting from contact with a naked light or fire; clothing saturated with tar or tar oils catching alight; catching alight of benzene used for washing the hands; unknown causes; hot gases or falls into hot liquids; eye injuries; accidents of other kinds; injuries to health from the escape of injurious gases from the stills, benzene poisoning, poisoning from the vapors of heavy oils, from hydrogen sulphide, and lastly, skin eruptions. Another section is devoted to measures for the protection of life and health.

The cases of poisoning interest most, and as usual, in these cases he recounts several instances of rash entry into stills before adequate clearance or detachment from neighboring stills, and subsequent sacrifice of the lives of fellow workers attempting rescue. Nine such cases are related in connection with tar stills, six with benzene poisoning, two from the vapor of heavy oils, three from hydrogen sulphide.

The suggested preventive regulations number seventeen, and deal particularly with (1) separation of dangerous premises; (2) provision of fire extinguishers; (3) lighting, which is from the outside; (4) localized ventilation where poisonous gases escape; (5) testing of the air in stills, etc., into which persons would have to enter and the roping of all persons who do such work, with a limit of ten minutes, at the most, after first entering to the time of coming out, etc.

[There is practically nothing in the recommendations which does not find a place in the Home Office Chemical Works Regulations, 1922.]—T. M. L.

INJURIES TO HEALTH IN THE INDUSTRIAL USE OF TRICHLORETHYLENE AND THE POSSIBLITY OF THEIR PREVENTION. *K. Stüber. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 398–456, in Bull. Hyg., April, 1932, vol. 7, pp. 213–214.*

Belonging to the group of chlorinated hydrocarbons of the fatty series, of which chloroform is the best known example, trichlorethylene has found the

most varied applications in industry as a good fat solvent and cleanser, especially of metal parts. Parallel with this is its powerful narcotic action and action as a nerve poison, the latter showing itself in paralysis of the trigeminus and optic nerves, as well as in apoplectic seizures, the result of injuries to the blood vessels in the brain. Long-continued inhalation of small doses leads to chronic effects involving the whole organism and to addiction. The paper contains a table embracing 284 cases of poisoning of which 202 were acute and eighty-two chronic. Of the total, twenty-five were fatal. Local irritative action is slight. Under different physical and chemical conditions (even light alone) trichlorethylene undergoes decomposition with formation of hydrochloric acid, especially in the presence of aluminium dust which may lead to explosions in closed vessels. In the presence of alkalies also it decomposes, forming, among other compounds, acetylene chloride which may give rise to fires. With naked flame it may decompose with formation of phosgene.

Open washing apparatus is recommended, while employment of young persons on machines containing the substance should be prohibited.

Appended is a summary of the 284 reported cases which the author has collected from many publications of factory inspectors and others. Fairly full details are given of the various types of attack—trigeminus paralysis, optic atrophy and neuritis, apoplexy (which she compares with a similar condition produced occasionally by carbon monoxide), and the inclination of trichlorethylene to induce addiction to its vapor.

[This is by far the most complete account of the effects of trichlorethylene that has so far appeared.]—T. M. L.

DUST HAZARDS AND THEIR EFFECTS

MEASUREMENT OF AVERAGE PARTICLE SIZE OF FINE PIGMENTS. *S. D. Gehman and T. C. Morris. Indust. and Engin. Chem., Analyt. Ed., April 15, 1932, vol. 4, pp. 157–162.*

A method of calibrating a micro-turbidimeter of the extinction type against particle size of rubber pigments is described. Particle size measurements were made by the ultramicroscopic counting method, employing accurate concentrations of well-dispersed suspensions. Satisfactory calibration curves were obtained although it is pointed out that smooth curves were given because of the uniformity of size in the individual suspensions.—T. H.

REPORT OF THE DEPARTMENTAL COMMITTEE ON DUST IN CARD ROOMS IN THE COTTON INDUSTRY. *H. M. Stationery Office, 1932, pp. 96.*

This report has unusual medical interest, since it promises to throw considerable light on the causation of spasmodic asthma. This disease, as it affects those exposed to dust in the card rooms of cotton mills, is a characteristic occupational trouble. The dust at first irritates only slightly; but as years pass, the irritation becomes more intense, until an asthmatic condition is established. Finally the operative may be compelled to give up work entirely. Well-applied localized ventilation has, during the past

twenty years, greatly improved matters; but uncertainty exists as to whether all harmful dust is today removed. The most harmful appears undoubtedly to consist of the finest particles, of about 5 microns in size.

The Committee, notwithstanding laborious investigation of sickness records, found itself unable to determine whether any harm is today resulting from the atmosphere of the workplace. It turned its attention to localizing the factor in the dust which is at fault. Clinical and X-ray examinations failed to indicate the presence of any pathologic characteristic in the lungs of those affected; pathologic investigations gave the same reply. Hence the conclusion was drawn that the condition depended upon contraction of the involuntary muscles in the walls of the air passages brought about by sensitization to some substance present in the dust. The exact substance which sets up this allergic condition has not definitely been isolated. Histamine was found in the dust, and may be the factor in question; but the whole matter has been referred for further research. The sufferers from the asthma gave positive skin reactions to extracts made from the dust, thus establishing the contention that this occupational trouble is due to sensitization.

Without waiting for further scientific research, the Committee recommends that every step shall be taken, as far as possible, to clear all dust from the carding engines by localized exhaust drafts, and to apply general ventilation to the card rooms, preferably by means of a downward draft, in order to keep all fine particles below the breathing level.—E. L. C.

PNEUMONOKONIOSIS AMONG THE MINERS OF REDJANG LEBONG (SUMATRA). *P. J. van Gulik. Abstr. as follows from Geneesk. Tijdschr. v. Nederl.-Indië, 1931, vol. 71, pp. 718–727, in Bull. Hyg., Jan., 1932, vol. 7, p. 21.*

According to Sleeswijk pneumonokoniosis is common among workmen employed in mines where the ground is poor in calcium but contains an excessive percentage of silicates. In order to verify this theory, the author examined the ore of Redjang Lebong and found that it was very rich in silicates and contained very little calcium. He therefore expected to find many cases of pneumonokoniosis among the miners who had worked more than fifteen years underground. The results of the clinical and of the radiologic examination of the miners showed a relatively small incidence of pneumonokoniosis, and the author thinks that this may have been due to a high percentage of moisture in the air of the mines (almost 100 per cent.). —H. L.

PNEUMONOCONIOSIS. *J. W. Gullikson. Northwest Med., Feb., 1932, vol. 31, p. 84.*

PULMONARY FIBROSIS: EXPERIMENTS OF SHORT DURATION. *W. S. Lemon and G. M. Higgins. Abstr. as follows from Am. Jour. Med. Sc., Feb., 1932, vol. 183, p. 153, in Jour. Am. Med. Assn., April 23, 1932, vol. 98, p. 1501.*

Lemon and Higgins believe that the fibrosis of the lungs produced in

workers exposed to dusty atmospheres, especially those in which fine particles of silica make up the larger percentage of the dust, is an end product and represents a progressive defeat of the protective mechanisms of the body. It is never found until the lung fails to rid itself of dust carried out of the bronchi by ciliary action or of dust carried through the lung by way of the lymphatic channels. With the breakdown in the carrying mechanisms, the burden of protection is the phagocytic cell, which, with its load of engulfed material, passes to all parts of the lung and ultimately becomes immobilized in those portions of parenchyma in which lymphatic tissue is abundant. The cells concerned are polymorphonuclear leukocytes, which are the first to appear, to disintegrate, and to disappear, and clasmatocytes, which appear later, are extremely active, break up less rapidly, and may become transformed into fibroblasts. In association with the tissue fibroblasts the clasmatocytes form scar tissue. Finally, fibrosis is the result of the action of substances secreted by the cell on the foreign particles. If a tissue poison results from this chemical action, fibrosis is encouraged, and is progressive, lasting as long as the unaltered irritant remains in the lung.—C. K. D.

ASBESTOSIS OF THE LUNG. *Gerbis and Ucko. Deutsch. med. Wchnschr., Feb. 19, 1932, vol. 58, p. 285.*

ACUTE SILICOSIS. *E. M. Chapman. Jour. Am. Med. Assn., April 23, 1932, vol. 98, pp. 1439–1441.*

The appearance of respiratory symptoms after eight, twenty-one, and twenty-nine months of exposure to an alkaline dust of high silica content marks a more rapid and severe silicosis than is usual. Russell has seen the disease fully developed in a lens grinder who inhaled a pure quartz spray for eight months. In granite cutters the earliest case without symptoms was found by roentgenograms after two years of service. The rapidly fatal cases of MacDonald occurred in two young girls who had been employed for two and three-fourths and four and one-fourth years packing a similar type of soap. The severity of respiratory embarrassment is attested by the marked decrease in the vital capacity, which was lower in the first case than that usually seen in uncomplicated cardiac failure.

TABLE 1.—SILICA CONTENT OF TISSUES

	MG. OF SILICON DIOXIDE PER GM. OF DRIED TISSUE	
	Lung	Bone Marrow
Normal	1.4	0.3 0.7
In chronic silicosis (King)	123.55	...
In Case 1: left upper lung	12.0	1.0
In Case 1: left lower lung	13.2	...

The right ventricular hypertrophy, described in the pathologic examinations, is probably explained by the increased resistance and loss of elasticity in the pulmonary vascular bed. This finding aided in the recognition of the disease in the living patient, in whom the diagnosis could not be made by the roentgenogram alone.

No determination was made of the

silica content of the dust or soap to which these men were exposed, but estimates of the silica content of the tissues of the first case, done by the method of King, are given in Table 1. The data suggest that the reaction in the lungs is not a direct, quantitative one and very likely, as Heffernan believes, the rapid development of fibrosis results from the accelerated formation of a silica hydrosol in the presence of the alkaline soap dust. Ordinarily this reaction progresses slowly in the faintly alkaline tissue fluids and may be so prolonged that symptoms do not appear until years after one has left a hazardous industry.

The three cases of acute silicosis that have been recorded are among the first such cases in American industry.

The rapidity of the process, in contrast to the usual chronic form, is probably due to the accelerated formation of silica hydrosol in the presence of an alkaline soap dust.—*Author's Comment and Summary.*

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

On the Frequency of Human Anthrax Infections. *A. Schmitz and F. Wielsch. Abstr. from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 749–766, in Bull. Hyg., April, 1932, vol. 7, pp. 232–233.*

In an introductory section the author summarizes the regulations that are in force for the prevention of the introduction of diseased animals or products from diseased animals into Germany.

Statistics are available of the number of cases of anthrax occurring in human beings in Germany from the year 1910, and the author quotes these to show that imported raw materials of animal origin are responsible for the majority of cases.

In a second table are set out the figures showing the origin of the infective materials in those cases of anthrax which occurred among men in the hide and hair trades. During the same period there were 1,060 cases; in 74.5 per cent. of these the material was of foreign origin, in 4.6 per cent. it was home produced, while in the remaining 20.9 per cent. its origin was not determined.

These 1,060 cases are again subdivided into three groups: namely, persons working in tanneries, transport workers dealing with hides, hair, etc., and manufacturers using hair of animal origin. The majority of cases (670) occurred among tanners; the other two groups were nearly equal in size, with 191 and 199 respectively. Materials of foreign origin are the source of the infection in from 60 to 80 per cent. of the cases. The author states that a considerable proportion of those due to infective material of undetermined origin should be classed as due to imported materials.

Tabulating the figures again to show the nature of the infection the author shows that in 95.4 per cent. of all the cases the infection involved the skin, with a fatality of 10.9 per cent. In 4.6 per cent. of cases the infection took place in the internal organs, and here the fatality was 94.5 per cent. During the twenty-nine years under review, 1,362 cases of anthrax occurred in

human beings as the result of handling animals ill or dead from the disease. Of these, 124, or just over 9 per cent. proved fatal.

The available figures for anthrax in Vienna are dealt with in a somewhat similar manner to those given above. The striking point is that the case mortality is 51 per cent., but tables show that 26 per cent. of cases were internal anthrax. In 14 per cent. of the total number of cases it is not stated in the records what form the disease took, but 95 per cent. of these terminated fatally.

During the period from 1921 to 1930, 126 cases of anthrax in man occurred in Austria, and of these twenty-four, or 19.2 per cent., were fatal.—A. L. S.

SYPHILIS IN RELATION TO OCCUPATIONAL INJURIES. *H. E. Alderson. Abstr. as follows from California and Western Med., 1931, vol. 35, p. 451, in Venereal Disease Information, U. S. Pub. Health Ser., Feb. 20, 1932, vol. 13, p. 72.*

Two cases are reported in which tertiary lesions of the skin appeared at the site of an injury. Following treatment with neoarsphenamine and bismuth the lesions promptly healed. Responsibility was accepted by the insurance carriers; the necessary treatment to eradicate the lesions only was authorized.

TUBERCULOSIS AMONG INDUSTRIAL WORKERS IN BUCHAREST. *E. Zlotescu. Abstr. as follows from Rev. igienă socială, 1931, vol. 1, pp. 97–104 (French summary), in Bull. Hyg., Jan., 1932, vol. 7, p. 37.*

Bucharest is an important industrial center and the working population shows a considerable amount of tuberculosis. With the exception of some figures by Banu for 1915 there have been no reliable statistics dealing with this disease. The author has analyzed the returns of the Ministry of Labor for the five years from 1925 to 1929 inclusive, and finds that the general tuberculosis morbidity during the period was 4.9 per thousand. A total of 3,458 were found tuberculous, of whom 3,294 were pulmonary cases (95.2 per cent.). The tuberculosis mortality among the workers was 0.87 per thousand; the highest fatality rates occurred among hairdressers (50 per cent.), compositors (36.6), and metal workers (30.3).—H. H. S.

THE IMPORTANCE OF DETECTING TUBERCULOSIS AMONG PERSONS MANIPULATING FOOD PRODUCTS, WITH REFERENCE TO AN INQUIRY INTO THE FEEDING OF PIGEONS. *A. Feil. Méd. du travail, March, 1932, vol. 4, pp. 34–37.*

The claim is made that risk may arise to food consumers from feeding young pigeons by human means. Such young birds are imported into Paris from Italy, being fed by the way, as they are too young to feed themselves. In nature the parent birds carry out beak to beak feeding; in the Parisian industry human feeders take their place by taking up a mouthful of grain soaked with water, and then applying their lips to the open beaks of the pigeons, within which they project the food into the esophagus of the chick. The workers are said to run a risk of taking diphtheria from the bird, or of acquiring aspergillosis from the grain. Now the sugges-

tion is made that if these human feeders are tuberculous, they will infect the young pigeons, who are being prepared for the food market. The roasting they are submitted to is insufficient to kill the tubercle bacilli. An examination of some of these human feeders did not, however, reveal the presence of definite disease. —E. L. C.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

Occupational Dystrophies of the Skin. Occupational Cutaneous Tumors. *J. M. Tomé Bona. Abstr. as follows from Siglo méd., 1931, vol. 88, p. 30, in Am. Jour. Cancer, May, 1932, vol. 16, p. 554.*

The author comments on the scarcity of material on occupational cancer in the Spanish literature and reviews the subject rather generally. He comments especially upon tar cancer, occurring in workers in tar and gas works, tar paper factories, and potteries; paraffin cancer; so-called mule spinners' cancer of the scrotum, which has appeared largely since the introduction of mineral lubricants as substitutes for lubricants of vegetable origin; and arsenical cancer, which, however, is only exceptionally of occupational origin, being related usually to the therapeutic use of the drug. Occupational carcinoma of physical origin is represented by cancer due to burns and cancer produced by the action of X-rays and of radium. The salient anatomic and clinical characteristics and the usual localization on the hands, as well as the limitation of the lesions by a peripheral inflammatory zone, permit the recognition of X-ray and radium cancer and separate these from the other forms of occupational cancer. Related cancers are encountered among the miners of Joachimsthal, where radium bearing ore is mined. The great majority of occupational cancers are histologically prickle cell epitheliomas, rarely basal cell growths. This does not mean, however, that they may not occasionally acquire the histologic structure of a sarcoma.

Dermatosis Due to Occupational Arsenic Poisoning. *F. Leoncini. Gazz. internaz. di med. e chir., Jan. 15, 1932, vol. 40, p. 1.*

Bakers' Dermatitis from Activators Containing Persulphates. *C. Badham. Studies in Indust. Hyg., No. 16, Rep. Dir.-Gen. Pub. Health, New South Wales, for 1930, Section I.-E, Indust. Hyg., pp. 71–76. Sydney, 1931.*

An outbreak of dermatitis occurred among bakers in New South Wales a few months after potassium or ammonium persulphate had been introduced in activators used in dough making. Activators, or yeast foods, accelerate the rapidity of yeast growth. Over fifty cases were recorded, which meant that about one man in every twenty of those employed in dough making was affected. The condition was one of vesicular papuloerythematous rash, occurring on the hands, forearms, arms, and neck, and sometimes on the lower extremities. It cleared up when the man left work, but tended to recur on his return. When persulphate was no longer added

to the yeast foods, the outbreak came to an end. Investigation revealed that those who suffered showed, by cutaneous tests, a sensitivity to ammonium persulphate; these men were generally of a susceptible or allergic type. The whole question of bakers' dermatitis, however, is not covered by these cases, since some men develop a skin idiosyncrasy to wheat dough which may be associated with asthmatic attacks. Dermatitis may also result from fungal infection in dough. The skin affection in these cases may be indistinguishable; but skin reaction tests, or the discovery of the fungus, will disclose the causative factor.—E. L. C.

Occupational Melanosis, with Report of a Case. *L. M. Wieder. Arch. Dermat. and Syph., April, 1932, vol. 25, pp. 624–641.*

1. Attention is directed to a group of industrial dermatoses in which melanosis is an important feature, and which heretofore has received little attention in the American literature.

2. The rôle of coal tar and petroleum derivatives possessing photodynamic activity as etiologic factors in these cases is reviewed.

3. A case is described in which a benzanthrone-anthraquinone compound and naphthalene containing only a minute trace of an impurity of unknown chemical formula are incriminated as etiologic factors by means of skin tests.

4. Biologic factors governing the development of pigmenting occupational dermatoses, together with prophylactic and therapeutic measures, are considered.—*Author's Conclusions.*

The Importance of Diseases Caused by Fungi (Epidermophyton) in Industrial Skin Conditions. *R. L. Mayer and A. Neumann. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 599–617, in Bull. Hyg., April, 1932, vol. 7, p. 212.*

Illness in a hat factory, especially in the wet processes where clothing, feet, and hands would be saturated, became prominent among the women workers. A few cases of dermatitis and eczema occurred which it would be natural to attribute to so well-recognized a cause as mercury (entering into several of the processes) or to the action of dilute sulphuric acid or shellac. Altogether twenty-three cases of inflammatory eruption suggestive of occupational origin occurred, affecting usually the fingers and back and front of the hand; in four cases it spread over the body. Several of them recovered speedily and had no recurrence even on returning to their previous work. More frequently, however, relapses occurred not necessarily on return to work, but also at home if they took up washing. Fourteen of the cases gave the picture of a dyshidrotic eczema. These cases were of particular interest occurring in such large numbers in a factory, as the natural course would be to regard them as cases of eczema due to hypersensitiveness of the skin to some inorganic agent. The authors discuss at length dyshidrosis, viewing it, however, as is general now, as of mycotic origin, nearly always due to the Epidermophyton developing on the hands and feet especially between the third and fourth toes. The authors

enlarge on the very wide dissemination of the condition since the war.

Returning to the subject of their inquiry in the hat factory they describe the results of examination of 133 workers of whom seventy-seven were engaged in wet processes. Among them they found fifty-six, or 73 per cent., suffering from interdigital mycosis and only eleven, or 20 per cent., among those on dry processes. They conclude, therefore, that the cases they were called on to investigate were not strictly due to the occupation but to mycotic infection by the Epidermophyton. They insist on the importance in all cases of inflammatory eczemas of exercising great care in differential diagnosis.—T. M. L.

Relation between "Ultra-Red" Cataract and Glass Blowers' Cataract. *A. Meesmann. Abstr. as follows from Arch. f. Augenh., 1932, vol. 105, pp. 268–287, in Am. Jour. Ophth., April, 1932, vol. 15, p. 394.*

Meesmann was able to produce cataracts in pigmented rabbits by radiating the eye with small doses of ultra-red rays. These cataracts developed as posterior polar opacities. Upon further exposure, a pennate opacity of the peripheral cortical fibers was formed. With large doses, flake-like opacities also developed in the anterior cortical fibers in the pupillary area. The author feels that these lenticular changes correspond to the changes found in glass blowers' cataract of the human eye.

Miners' Nystagmus and Mine Lighting. *W. J. W. Ferguson. Tr. Inst. Min. Eng., 1930, vol. 79, p. 237.*

This paper deals with (*a*) the medical treatment of nystagmus, and (*b*) the effect of mine lighting on nystagmus.

An earlier paper by the same author (see This Jour., 1930, vol. 12, Abstr. Section, p. 201) described his method of treatment of a few cases and its results. The present paper gives the results of the daily administration of 15 grains of calcium lactate and 2 capsules of radiostoleum (vitamin D) in many more cases. In all cases the headache, giddiness, and dazzling that accompany nystagmus disappeared quite early in the treatment, and there was a rapid improvement in general health. The actual oscillations do not show such rapid improvement, but the author thinks they decrease in frequency more rapidly than in untreated cases. In order to ascertain whether the effects of the treatment were due to psychologic causes, nonactive drugs were, in some cases, substituted without notifying the men of the change; but the substitution was invariably followed by the headaches and other subjective symptoms, and these again improved on the return to proper treatment.

At a certain colliery a shift of twenty-seven men was equipped with high candle power electric lamps, and a control shift, supplied with the lamps in common use, was also observed. At the beginning of the experiment, five of the twenty-seven men in the experimental group were found to have definite miners' nystagmus, and the remaining twenty-two were normal. At the end of six months only three of the five men showed oscillations, which in two of them were much the same as before and in the third only slight. All five

were free of the subjective symptoms. None of the remaining twenty-two men had developed any symptoms of nystagmus.

In a discussion of the paper, reference was made to the influence on output of the increased illumination obtained by substituting electric cap lamps for the usual hand lamps. The yardage per shift cut by coal cutter men was increased by 13.5 per cent. with the cap lamps, and the number of holes per shift bored by coal borers increased by 19 per cent.—T. B.

MINERS' NYSTAGMUS AND MINE LIGHTING. *W. J. W. Ferguson. Tr. Inst. Min. Eng., 1932, vol. 82, p. 367.*

The author describes the results of further medical treatment of nystagmus. Several hundred men have now been treated as described in his previous paper. Some of the men were incapacitated, while others were still working. Invariably, marked improvement in subjective symptoms was observed early in the treatment, though the oscillations were not so easily affected.

The experiments described in a previous paper (see preceding abstract) on the effects of using higher candle power lamps have been continued for over two years (with breaks on account of bad trade). After two years the men originally suffering from nystagmus were still free from subjective symptoms, and the oscillations could no longer be elicited. None of the remaining members of the experimental shift showed any signs of nystagmus. In the control shift one new case of nystagmus had developed.

At another colliery a similar experiment was carried out; the high candle power lamp in this case was of the flame safety lamp type and gave a candle power of about $2\frac{1}{4}$. A control shift of men was equipped with the ordinary flame lamp. There were forty men in each shift. At the outset, seven men in each shift showed signs of nystagmus. After eight months none of the men in the control shift had improved and two fresh cases had developed. In the experimental shift two of the seven cases had become free from oscillations, and there was marked improvement in the amount of oscillation in two others. All seven were free from subjective symptoms. There were no new cases. —T. B.

FOCAL SEPSIS A PREDISPOSING FACTOR IN MINERS' NYSTAGMUS. *F. O'Sullivan. Brit. Med. Jour., April 2, 1932, vol. 1, pp. 611–612.*

A case is quoted of a collier, aged 39, who had worked underground for twenty years without any eye trouble. He then developed a localized abscess in the right buttock, which, after healing, again broke down six months later, when he developed miners' nystagmus. The author holds that this focal sepsis may have played a part in predisposing to the condition.—E. L. C.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

MATERIAL HANDLING ACCIDENTS AND THEIR PREVENTION. *R. B. Northrup. Abstr. as follows from N. Y. State Dept. Labor, Indust. Hyg. Bull., 1931, vol. 8, pp. 13–15, in Bull. Hyg., Feb., 1932, vol. 7, p. 82.*

The claim is put forward that many accidents result during the handling of goods, quite apart from the intervention of mechanical means. In New York in 1930, no less than ninety-two lives were lost in this way; there were also 5,101 cases of partial disability, and 25,991 cases of temporary disability. The cause of so much fatality and injury demands attention. Men often handle articles which are too heavy, when back strains and hernia may result; or they may not have been instructed in methods to use when handling heavy packages. The predominant cause in accidents of this class is handling heavy and bulky objects. Next comes the dropping or falling of objects while carrying, lifting, or rolling barrels, boxes, and the like. A similar number of accidents results from loading, unloading, and piling material. Still the predominant number of accidents results from carrying material, that is, from the use of brute strength. Apart from studying carefully how objects should be moved and packed, the introduction of mechanical means to do away with man force is an obvious method of minimizing this class of accidents. Limits should be placed to the weight which persons should be expected to lift; where the article may be infected, such as meat, the skin of the neck and shoulders should be guarded against contact, so as to avoid the boils and infected abrasions which result from contact with the hides of animals.—E. L. C.

CLIMATE

The Pathogenic Action of Atmospheric Humidity. *A. Rochaix. Abstr. as follows from Mouvement Sanitaire, 1931, vol. 7, pp. 524–528; 531–538; 541–543, in Bull. Hyg., Feb., 1932, vol. 7, p. 132.*

Microbes survive much better in humid aid than in dry air, and, it is said, still better if the air contains traces of nutriment. According to Trillat, atmospheric vapor consists of minute droplets (less than 10^{-5} cu. mm.). The microbes themselves form the nuclei of condensation, and each of these droplets becomes a sort of microscopic fog in which the organisms develop. It is said that the germs conserve their vitality by favor of gaseous nourishment derived from the respiration of living beings, of putrefying matter, etc. Experiments are cited showing the influence of atmospheric humidity on the aerial transmission of infection. Reference is made to the effect of fogs on mortality. A cloudy atmosphere has a marked screening effect against cosmic radiation.—T. B.

WOMEN AND CHILDREN IN INDUSTRY

Woman Labour in India: I and II. *R. K. Das. Abstr. as follows from Internat. Labour Rev., Oct., 1931, vol. 24, pp. 376–409; Nov., 1931, pp. 536–572, in Bull. Hyg., Feb., 1932, vol. 7, pp. 82–83.*

These two articles are based on a mass of statistical and documentary

information regarding the gainful occupation of women in India. That country remains essentially an agricultural one, and women are largely employed as field laborers and farm servants. The number of women employed in organized industries, such as plantations, factories, and mines, is as yet very small; nevertheless, India is increasingly becoming an industrial country and women are already being drawn into industrial work. Today by far the largest number are employed on plantations for the production of tea, coffee, and rubber, where the work is only a special kind of agriculture, and is congenial to women drawn from rural districts. Plantations have developed greatly in recent years, so that on Assam tea gardens, whereas 50,752 women and 46,544 children were employed in 1877, in 1929 to 1930, 283,730 women and 463,652 children were employed.

Only those familiar with Indian life and customs will grasp the significance of the data quoted, which tell of the development of Factory Acts and mining legislation in recent years. The way in which workers are recruited is described, and also the conditions under which they are used in the industrial towns, which are far from agreeing with modern sanitary knowledge. Indian women are behindhand as workers; they are inefficient and unpunctual; in the cotton mills they are not even employed as weavers. On the plantations malaria, dysentery, and hookworm lower vitality and efficiency, and tea gardens may be grouped as "unhealthy," which means that the death rate exceeds 70 per thousand inhabitants; but improvement is taking place. Among the factories some compare favorably with factories elsewhere, but they are the exception. Women are still being employed underground in mines; this form of employment, however, is gradually coming to an end, as a result of legislation. Hours of labor are being brought into agreement with those in other civilized countries; but the hours today actually worked differ from the hours spent in the factories, as workers stop work or go out for drinking, eating, and the like, at unauthorized times, so spending about one-fourth of their regular time. The average daily working force at Assam tea gardens had a 37 per cent. absenteeism among women, 23 per cent. among men, and 30 per cent. among children in 1929 to 1930. Excessive labor turnover also affects the industrial efficiency of women; and unpunctuality is a common defect of great consequence where the working time of machinery and mechanical power is under consideration. A result of the inefficiency is that women workers in India are employed in unskilled and poorly paid work. Even so, they tend to be exploited by those who supply and command this source of labor.

Investigation of family budgets revealed that over half the expenditure was on foodstuffs, which closely agrees with investigations made in Great Britain. And yet the standard of living is very different; clothing is scarce; articles of furniture are few, and may exclude beds; the whole outfit of the house does not cost more than a few rupees, while it lacks comfort and is uninviting. Even so, indebtedness is common, and about half the families investigated were

found to be in debt, generally amounting to two and one-half months' earnings. While some effort has been made to house workers on plantations, at mines, and in industrial cities, generally the accommodation is poor, and may be said to contribute largely to the high mortalities which prevail; thus in Bombay tenements, the rate of infant mortality per thousand registered births amounted in 1927 to 490 for inhabitants of one-room tenements. Welfare work is needed to secure for workers the amenities of life, and has here and there been developed. The commonest form has been medical aid, which, however, it is often difficult to get the women to accept. One need in India is the provision of crèches for infants; but outside Bombay they are almost unknown. Today education in India is meager, and reaches only a small fraction of the population; yet industry needs better trained labor.

There is danger that modern industry may lower the moral standard of Indian women, which has been their great pride; on the other hand, industrial development is undoubtedly widening the outlook, and helping to break down caste prejudices, with regard to untouchability and the purdah system. Legislation is wisely prohibiting the employment of children, and guiding the industrial development, so that many pitfalls encountered in other countries may be avoided. Without doubt, the industrial development of India must be so guided that female labor can be healthily and morally used in its development, since only in this way can the proper equality of the sexes be rightly established. Without such equality, the development of industry in India will not give of its best to the country.—E. L. C.

FURTHER OBSERVATIONS ON THE DIETS AND MATERNITY CONDITIONS OF WOMEN WORKERS IN BOMBAY. *S. K. Talpade. Abstr. as follows from Indian Jour. Med. Res., 1931, vol. 19, pp. 485–489, in Bull. Hyg., Feb., 1932, vol. 7, p. 77.*

The previous investigations, by Wills, and by Balfour and Talpade (see THIS JOUR., 1931, vol. 13, Abstr. Section, p. 39) into the social conditions of women of the industrial class in Bombay with special reference to diet and the result on children born, was continued during the past year, and the author describes the result of such a study of forty-five Hindu women, about one-half of whom were Ghatees and one-half Konkanees. There is no significant difference between the diets of these two, but the diet of the women millworkers was higher than that of the nonworking wives of millworkers. Furthermore, in the present series the mill class as a whole was better off than at the time of the previous investigation and was therefore able to afford a more liberal diet.

Though the workers are better off and better fed than the nonworking wives, the average weight of the babies of the nonworkers was higher than that of the workers. This may possibly be due to the injurious effect of work during the later months of gestation. But the average baby weight in both classes has increased, presumably owing to the better food supply.

The immunity from anemia of pregnancy in these working class

women may be due to the presence of whole grain, rich in vitamin B and salts, in the diet.—L. W.

WOMEN IN INDUSTRY: MEDICAL ASPECTS OF LEGISLATION. *Supplement, Brit. Med. Jour., March 26, 1932, vol. 1, pp. 105–106.*

Dr. Murrell, in opening the discussion, put the case of equal rights for men and women in industry, holding that laws restricting women from certain types of work were not based on convincing evidence of any deleterious effect exerted. The laws result not infrequently from representations made by male competitors. Women take to night work more naturally than do men, certainly for the purposes of nursing. Evidence indicates that women, just as men, benefit in health by improvement in general conditions of labor, good pay, and reasonable hours; and these improvements should be attended to, instead of restricting women from employment in the more dangerous trades. Dr. Mummery, on the other hand, pointed to certain disabilities concerning women, whose sickness rates are usually in excess of those for men. His figures for 1930 show that five cases of illness occurred among every seven female operatives, as against five among every eleven males. Digestive disturbances affected females much more than males; but fibrositis was more prevalent among the men. Women are seldom required to do heavy lifting, and, possibly owing to less exposure to risk, sustain far fewer injuries. He considered that protective legislation in regard to women in industrial work was necessary.—E. L. C.

INDUSTRIAL ENVIRONMENTAL CONDITIONS

ROOM WARMING BY RADIATION. *A. H. Barker. Heating, Piping and Air Conditioning, Jour. Sec. of Am. Soc. Heating and Ventil. Eng., March, 1932, vol. 4, pp. 207–214.*

This article presents the results of an investigation of the conditions where radiant heat is used in England, together with some description of the research on the subject. Throughout the article, heating by radiation is compared with heating by convection with regard to (1) physiologic considerations, (2) operation, (3) calculation of heat requirements, and (4) application.

It is now generally accepted in England that a higher radiant temperature and a lower air temperature result in a feeling of greater freshness for the same rate of heat loss from the body than with a higher air temperature and a lower radiant temperature. This idea was substantiated by the results on students of one of the large English public schools.

In radiant heating, the heating of the air is a secondary rather than a primary object. In the calculation of the units necessary, instead of finding heat loss as is done in convective heating, an attempt is made to estimate the temperatures which various surfaces will assume; by means of a table of values, the calculations are carried out quite simply. The conditions to be secured are 63°F. air temperature and 61°F. radiant tem-

perature. This was determined by comparing the human body to calculated equivalent cylinders and then finding the temperature necessary for the comfort of a sedentary worker who, according to Rubner, gives off per hour 195 B. T. U. by radiation and 138 B. T. U. by convection. In radiant heating, the heat is practically used twice—once in maintaining radiant temperature and again in a secondary convection.

For the radiating sources, several systems are in use. The first consists in forcing hot water or steam (rare) through coils embedded in the ceiling or walls. Iron plates heated by hot water, electricity, or gas (gas is seldom used because of odors of combustion) are also used. These plates are sometimes covered by wood veneers. Sometimes in schools, churches, etc., the floors contain the radiators. In some cases preparation is made for increased convection about the radiator, thereby increasing the total heat output but also increasing substantially the fuel consumption.

While realizing the advantages of the British radiant heating method over the American convection methods, the author apparently has overlooked the probable drawbacks of the English system when applied to the much colder and drier climate of the United States. It is very doubtful whether radiant heating can be used satisfactorily in this country without being supplemented by ordinary radiators under windows, or by plenum systems for the purpose of counteracting the down drafts of cold air leaking in through window and door cracks. If this is done, the cost of the system would be an important limitation to its general use.

Another important point to be considered is whether Americans would be as comfortable in a room heated to 63°F. by the radiant method as they are now at 70 or 72° with the ordinary convection methods. The facts which must not be overlooked are that the British, owing to the heavier clothing which they wear (especially the women) and to the considerably higher atmospheric humidity, require considerably lower room temperatures than Americans (usually 63 to 66° as against 70 to 75°). If this is true and the difference in heating standard is allowed for, the claim for fuel conservation with the radiant system would not hold for conditions in this country.—A. D. B.

Construction of the Davos Frigorimeter. *R. Thilenius. Meteorol. Ztschr., 1931, p. 254.*

The paper describes an amended form of the Davos frigorimeter of Dorno, a recording instrument for measuring the total cooling effect of the environment. The instrument takes the form of a blackened copper sphere (7.5 cm. in diameter) which is heated electrically. When the temperature of the thermometer inside the globe reaches 37.5°C., a release is operated and the current is shut off. When the temperature falls to 36.5°C., the release again acts and the heating circuit is again closed. The period during which the heating current flows is recorded by a clock. The mean rate of cooling is obtained from the ratio (heating period)/(heating period + cooling period).—T. B.

SOME NOTES ON THE APPLICATION OF PRESSURE SURVEYING. *F. B. Hinsley and J. C. Mitcheson. Tr. Inst. Min. Eng., 1932, vol. 83, p. 24.*

The paper gives an illustration of the way in which regular barometric surveys may be utilized to increase the ventilation efficiency of a mine. The figures quoted show that as a result of the surveys substantial savings were effected on ventilation costs.—T. B.

THE INFLUENCE OF INFRA RED RADIATION IN RELATION TO VENTILATION AND HEATING. *L. Hill. Jour. State Med., Dec., 1931, vol. 39, pp. 683–687.*

In sensitive subjects the dull red radiation from an electric fire produces a feeling of stuffiness. A gas fire, properly flued and fitted with the new "Beam" radiants, which afford a bright red glow, has no such effect. Nasal obstruction can be produced by an electric fire placed 47 feet away from the face. Turning the back to the fire, or interposing a screen, immediately results in the nose opening. It is concluded that the effect on the nose is a nervous reflex due to the non-penetrating infra-red rays warming the surface of the skin and stimulating cutaneous nerves.

The closing of the nose by the electric fire is set aside by the radiation from the glowing red gas fire. If the face is warmed by the electric fire the effect on the nose is counteracted by the rays from the gas fire falling on any other part of the skin (except the palms of the hands or the soles of the feet).

Water vapor screens off the long infra-red rays and a screen of steam prevents the closure of the nose by the electric fire.—T. B.

SOME PHOTOMETRIC COMPARISONS OF THE ILLUMINATIONS PRODUCED BY DIFFERENT LIGHTING ARRANGEMENTS UNDERGROUND. *E. J. Kimmins. Tr. Inst. Min. Eng., 1932, vol. 82, p. 400.*

Studies of illumination in mines have previously been confined mainly to the consideration of the intrinsic candle power of different types of lamp, and the study of the distribution of light in different directions. Useful information has been yielded by the polar curves obtained in such investigations, but an investigation of the actual illumination of the working face has been long overdue. Such a study is described in this paper.

The first lighting system described consisted of five 100-watt lamps supplied from the power mains and spaced from 30 to 45 feet apart. Three of the lamps were clear glass bulbs and two were semifrosted. All were enclosed in frosted well-glasses. A desirable minimum standard of illumination was taken to be $4\frac{1}{2}$ lux, since it was assumed that such an illumination would suffice for macular vision. With the arrangement described, only 28 per cent. of the coal face received illumination of this intensity. Twenty-four per cent. of the face had less than 1 lux, yet opposite the clear glass bulbs the illumination reached from 12 to 18 lux.

A further arrangement was made using lamps of lower candle power with closer spacing. Sixty-watt pearl lamps were spaced 18 feet apart. When frosted well-glasses were used, 100 per cent. of the face received 3 lux, and 67.5 per cent. reached the standard of $4\frac{1}{2}$ lux. When opalescent well-glasses were used the illumination diminished, 66.5 per cent. of the face

receiving 3 lux, and only 39 per cent. 4½ lux. The opalescent glasses were preferred as they reduced glare, and the illumination was brought up to the level of that obtained by the frosted well-glasses by substituting 75-watt bulbs.

An interesting comparison was made of the illumination from various sources of lighting. A length of coal face was lighted alternately by (*a*) five flame safety lamps, (*b*) five miners' candles (eighteen to 1 pound), (*c*) five acetylene flares, and (*d*) one mains lamp (100-watt in opalescent well-glass). In each case the lamps were placed where the miners would ordinarily have them. With the flame safety lamps the illumination reached only ½ lux on 37.5 per cent. of the face, and no part had 1 lux. With the candles, 66.5 per cent. was lighted at 1 lux, and 23.5 per cent. at 2 lux. The single mains lamp gave 67.5 per cent. at 1 lux, and 33.5 per cent. had 4½ lux or more. The acetylene flares gave 2 lux on the whole face, and 43.5 per cent. of the face had 4½ lux or more. The acetylene flares, however, have the disadvantage of giving a very dazzling light.

A third mains lighting arrangement which gave at least 4½ lux, and over most of the face considerably more, employed a new type of lamp fitting somewhat like the bulkhead pattern, but with a light distribution of 180°. Pearl bulbs of 75 watts were used.—T. B.

RECOMMENDED FOOT-CANDLES. *M. Luckiesh and F. K. Moss. Tr. Illumin. Engin. Soc., Dec., 1931, vol. 26, pp. 1061–1092.*

Intensity of illumination, utilized in accordance with known relationships between lighting and seeing, is the most generally efficacious means at the command of the lighting specialist for assisting vision. Various other factors or refinements in lighting increase in significance as levels of illumination are increased. Although the foot candle is a fundamental unit in lighting specifications, its characteristics are generally incompletely understood or ignored. Physically, the foot candle is a definite and measurable unit; visually, or as an aid to seeing, it is a variable psychophysiologic quantity. The various characteristics of the foot candle are discussed and data are presented for the purpose of advancing the scientific use of this factor in lighting recommendations and practice.

Present foot candle recommendations are generally based upon the narrow economics of current and past lighting practice rather than upon the broader foundation of new scientific knowledge and principles. Such recommendations are usually unnecessarily conservative and are frequently in mutual disagreement. The development of a science of lighting for seeing has made it possible to reveal some of the imperfections of present foot candle recommendations and to assist in correcting or eliminating such shortcomings. The science of lighting for seeing, while still in its early stages of development, provides a sound if not complete foundation for better standards of lighting for the work world and for all other places where human eyes are used for serious visual tasks.—*Authors' Synopsis.*

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

SOME ASPECTS OF INDUSTRIAL MEDICINE. *N. H. Mummery. Proc. Roy. Soc. Med., March, 1932, vol. 25, pp. 679–684 (Epidem. and State Med., pp. 25–30).*

Some interesting statistics are given regarding the work of an industrial clinic at a factory manipulating food. During 1930 the number of injuries treated was 9,995, in 15.4 per cent. of which the employees were put off duty; cases of illness numbered 12,258, in 23 per cent. of which the employees were put off duty. Acute respiratory diseases, which affected both sexes equally, accounted for the largest number of cases, with an average absenteeism of eleven days per case. Gastritis caused an average absenteeism of nine days per case, and affected females more than males. Fibrositis, with an average of seventeen days per case, was more prevalent among males. Diseases of the ear, nose, and throat were more common among females, with an average of twelve days per case. Furunculosis was three times as common among males, with an average of thirteen days per case. The incidence of illness was more among the females (109.6 per cent. of cases) than among the males (47.1 per cent. of cases). On the other hand sick absence was more prolonged among the males (fourteen days per case) than among the females (eleven days per case). Since medical supervision has been established, a definite drop in lost time due to sickness has resulted. Injuries, with few exceptions, are treated at the clinic, an arrangement which has greatly reduced the time lost. Without doubt, industrial medicine can render a service of cash value to the employer, which helps him to pay good wages and provide employment for increasing numbers.—E. L. C.

INDUSTRIAL PERSONAL AND COMMUNITY HYGIENE: HOUSING, ETC.

WORK AND DWELLING. *W. von Drigalski, H. P. Herrmann, and F. Richter. Beiheft z. Zentralbl. f. Gewerbehyg., 1931, no. 22, pp. 67. Reviewed as follows in Bull. Hyg., Jan., 1932, vol. 7, pp. 18–19.*

The first and second papers resemble each other considerably in laying down the general principles which should govern the erection and environment of artisan dwellings. They are such as are enunciated in any book dealing with town planning and workmen's dwellings and need not be further dealt with here.

The third paper, by the engineer of the Siemens-Schuckert Works at Nürnberg, gives valuable particulars of the need for proximity of the artisan's dwelling to his work. He cites the instance of the increase in population at the Leuna Works for the production of nitrogen; the site chosen was suitable for manufacture but the population had to be attracted there. In three years the total popula-

tion had doubled and of the 8,921 persons employed, 6,056 required more than half an hour to reach the works, and of these 3,473 required more than one hour both going and coming. About 1,100 fathers of families took over six hours daily in going to and from work.

He describes the difficulties encountered by the Siemens Works in Berlin with 60,000 persons employed, drawing its workers from all parts of Berlin and its environs, requiring alterations in the time of commencing and ending work for large groups so that facilities by rail and road should not be overtaxed. Eventually the firm had to construct its own railway from Berlin to the works, and had to build two bridges over the Spree.

Maps are given showing the density of population around the factory and the means eventually provided for reaching it.—T. M. L.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

ARMY ALPHA—REVISED. *F. L. Wells. Personnel Jour., April, 1932, vol. 10, pp. 411–417.*

"The five forms of Army Alpha were each recast into a form designed for more convenience in giving and scoring, while preserving the existing norms for total scores. Comparisons with the original Army Alpha involving a total of some 1200 subjects show substantially similar correlations of Army Alpha against the revision and Army Alpha against itself, so that the scores are, in the upper 25 per cent. range, comparable for all practical purposes. The economy of the revision in ease of giving and scoring is considerable."

EMPLOYEE ATTITUDES. SUGGESTIONS FROM A STUDY IN A FACTORY. *A. W. Kornhauser and A. A. Sharp. Personnel Jour., April, 1932, vol. 10, pp. 393–404.*

"To secure a picture of the major influences affecting individual feeling and attitudes of a group of women factory workers, an investigation was undertaken which is here reported in part. Work feelings and attitudes were tapped by questionnaire and interview methods. Great care was taken to get the cooperation and trust of workers and supervisors. Purely statistical evaluation of the data is subordinated to more personal, not objectively provable 'understandings' or interpretations based on insight into the whole picture. Some findings, however, were objectively verified. In two departments all work conditions were fundamentally the same, with one exception—character of supervision. Great dissatisfaction in one department could only be explained by the unfortunate nature of the supervision there. It is significant that negative feelings aroused by poor supervision spread to other and unrelated matters. Some slight relationship was found between attitudes and measured facts about the workers. Correlations between favorableness of attitudes and individual scores for emotional adjustment are low but positive. The data are analyzed to find the sorest spots of dissatisfaction and worry. Fear of lay-

off or loss of job entirely is most pervasive."

A Classification of Vocational Tests of Dexterity. *A. E. W. Long and T. H. Pear. Indust. Health Res. Board, Rep. No. 64, pp. 64. H. M. Stationery Office, 1932.*

This report is a useful compilation drawn from literature dealing with tests directed at detecting manual dexterity and motor capacity. A great amount of work has been directed on such research, all of which is usefully brought together and succinctly described, particular attention being paid to the work of continental observers. Finally, some general conclusions are drawn from the material which is being reviewed. The existence of any particular "manual capacity" is doubted. One person may be efficient at one form of activity, but not at another, and vice versa. Tests to determine suitability for any occupation prove most successful when they are as complex as the occupation, when the individual tests from the series are as different and as numerous as possible, and when the time allowed to perform them is as long as is practicable. This report is of value not because it establishes the existence of certain clear laws of activity associated with individual reactions, but because it throws doubt upon the existence of such laws, and rather indicates that each process must be considered specifically.—E. L. C.

Some Recent Researches in Great Britain on the Psychology of Work. *C. S. Myers. Abstr. from Jour. Nat. Inst. Indust. Psychol., Oct., 1931, vol. 5, pp. 423–433, in Bull. Hyg., Jan., 1932, vol. 7, pp. 15–16.*

Measurements have revealed increases in output on "making-up" at the end of a piece of work and when work is presented in separate blocks, not too large and not too small, in place of being presented as a tediously long whole. Rest pauses appropriately spaced have the same effect, despite the reduction effected in the total time taken over the work. Curves of work vary with the nature of the work, the individual worker, and the various degrees of skill shown. Where the work is boring rather than fatiguing, output is more irregular and falls off far earlier than can be ascribed to fatigue. What is boring to one operative is not boring to another. Some enjoy the daydreaming which repetitive work permits. Some find consolation for monotony in the incentives of piece rates and others by recourse to conversation. Change of work is the most obvious antidote to monotony but must be carefully introduced and controlled. For different types both of work and of worker there is an optimum frequency of change. Too many changes may prove detrimental to output because of their unfavorable effect on the factors of incitement—warming up, getting into the swing and rhythm of the work. Appropriate changes tend to diminish or to prevent the adverse effects of boredom on output during the middle of the spell, while anticipation of coming changes produces a more buoyant attitude toward the task, yielding an increased rate of working in the earlier and later stages of the spell. Some persons change with difficulty from one kind of work

to another; others with far greater ease. Extreme "perseverators" and extreme nonperseverators are apt to be unstable, unreliable, and uncontrolled, whereas the moderate nonperseverators generally show the opposite characters. In any individual there seems to be little or no general motor capacity so far as the simpler movements are concerned. One who excels in one simple motor test may not excel at another. Practice at one simple movement causes little or no subsequent improvement in other simple movements. There is little if any transfer of practice in such cases. But it is highly probable that there would be a transfer of training if the learner were so instructed that he grasped general principles and adopted favorable attitudes applicable to the acquirement of skill in other movements. One general factor in the capacity of the individual has been found in routine assembling and another in intelligent assembling, distinct from one another and from general intelligence. We have to recognize (1) a general intelligence concerned with abstract thought and symbols—*e.g.*, words and figures; (2) a general intelligence concerned with working on concrete objects; and perhaps, (3) a general intelligence concerned with the handling of living persons. But abilities of these kinds are not the sole psychologic determinants of the performance of work. Interest, temperament, character, and indeed the whole personality of the individual have also to be taken into account.

In the choice of an occupation, the person's interests often play an important part. There is, however, evidence to show that in about 50 per cent. of young people they are at variance with the suitability of the person for the work for which he professes an interest. The unsuitability appears to be as often due to defects of ability as to defects in temperament and character. Interests must be genuinely in the work and not in any unessential feature; too often they are based on inadequate knowledge or are otherwise unworthy of weighty consideration.

Accidents have been shown to be dependent on character, temperament, and mood as well as on abilities, experience, and fatigue. If the worker chooses to work more slowly when tired he may thus exercise the care necessary to avoid accidents. But if he strives to maintain his normal output, his liability to accidents is likely to increase. Liability to accident is not distributed uniformly among any homogeneous group of workers. Some are especially prone to accidents. In certain groups of workers the accident rate of one quarter of their number was about two and a half times as great as that of the remaining three quarters.—E. D. M.

Effectiveness of Labour Incentives. *G. H. Miles. Human Factor, Feb., 1932, vol. 6, pp. 53–58.*

Pure financial incentives, though of great importance, have certain limitations. The desire for gain may cause a bonus system to operate well at first, but after a few months its incentive value begins to fall, and it may operate only when the employee wants to make extra money—*e. g.*, just before a holiday. Again, a profit sharing scheme generally acts as a strong incentive at first, but later on, especially if there are no profits available,

it may even cause resentment. Group bonuses are apt to induce the quick worker to slow down to the rate of the average, rather than to encourage co-operation.

Nonfinancial incentives which emphasize the co-operative and community spirit should be adopted when possible. Pride in work and a lasting interest in it should be encouraged by endeavoring to make a suitable choice of occupation for each worker. Outside recognition and appreciation of good work should be generously given, and there should be a well-organized system of promotion by merit. Some firms enhance the value of promotion schemes by systematic instruction and training in the actual work.—H. M. V.

A Second Follow-up of Vocationally Advised Cases (1927–8). *A. Macrae. Human Factor, Feb., 1932, vol. 6, pp. 42–52.*

Of the cases followed up, 44 were studying at universities, and 134 had been engaged in their chosen occupations for periods ranging from a few months to three and a half years. The results obtained with the students did not show a higher percentage of successes among those who followed the advice offered than among those who rejected it, but various reasons are advanced for this result. The 134 boys and girls engaged in various occupations such as clerical work, industrial administration, salesmanship, etc., gave a very encouraging result, for of the 90 individuals who adopted the advice offered, 76 were considered to be a success, 6 were doubtful, and 8 were unsuccessful. In contrast to these figures, the 44 individuals who took up an occupation considered unsuitable showed 17 successes and 17 failures, while 10 were doubtful.—H. M. V.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

Labor Legislation of 1931. *Abstr. as follows from Am. Labor Legis. Rev., Dec., 1931, vol. 21, pp. 410–472, in Personnel Jour., April, 1932, vol. 10, pp. 434–435.*

This article summarizes labor laws enacted by the seventy-first Congress, third session, and laws enacted by forty-four states, two territories, and two insular possessions which held regular and special sessions. The following classification is used: individual and collective bargaining, minimum wage, hours, employment, safety and health, social insurance and administration; and the abstracts are arranged by state under each subject. Part II lists the laws by states, with the chapter and page references to session law, using the same classification as in Part I under each state.

The Asbestos Industry Regulations, 1931, Dated December 31, 1931, Made by the Secretary of State under Section 79 of the Factory and Workshop Act, 1901. *Reprinted from Statutory Rules and Orders, 1931, No. 1140. H. M. Stationery Office, 1932, pp. 6.*

In pursuance of Section 79 of the Factory and Workshop Act, 1901, I hereby make the following Regulations and direct that they shall apply to all

factories and workshops or parts thereof in which the following processes or any of them are carried on:

i. Breaking, crushing, disintegrating, opening, and grinding of *asbestos*, and the mixing or sieving of *asbestos*, and all processes involving manipulation of *asbestos* incidental thereto;

ii. All processes in the manufacture of *asbestos textiles*, including preparatory and finishing processes;

iii. The making of insulation slabs of sections, composed wholly or partly of *asbestos*, and processes incidental thereto;

iv. The making or repairing of insulating mattresses, composed wholly or partly of *asbestos*, and processes incidental thereto;

v. Sawing, grinding, turning, abrading, and polishing, in the dry state, of articles composed wholly or partly of *asbestos* in the manufacture of such articles;

vi. The cleaning of any chambers, fixtures, and appliances for the collection of *asbestos* dust produced in any of the foregoing processes.

Provided that nothing in these Regulations shall apply to any factory or workshop or part thereof in which the process of mixing of *asbestos* or repair of insulating mattresses or any process specified in group v or any cleaning of machinery or other plant used in connection with any such process, is carried on, so long as (*a*) such process or work is carried on occasionally only and no person is employed therein for more than eight hours in any week; and (*b*) no other process specified in the foregoing paragraphs is carried on.

Provided further, that if the Chief Inspector of Factories is satisfied in respect of any factory or workshop or part thereof that by reason of the restricted use of *asbestos* or the methods of working or otherwise, all or any of these Regulations can be suspended or relaxed without danger to the health of the persons employed therein, he may by certificate in writing authorize such suspension or relaxation under such conditions as he may think fit. Any such certificate may be revoked at any time.

These Regulations may be cited as "The Asbestos Industry Regulations, 1931," and shall come into force on March 1, 1932, except that Regulations 2*a* and 5 shall not come into force until six months after the said date, and Regulation 1*a* (ii), so far as it applies to looms, Regulation 3*a* and *b* (i), and Regulation 4*b* shall not come into force until twelve months after the said date.

Definitions[1]

Asbestos means any fibrous silicate mineral, and any admixture containing any such mineral, whether crude, crushed, or opened.

Asbestos textiles means yarn or cloth composed of *asbestos* or *asbestos* mixed with any other material.

Preparing means crushing, disintegrating, and any other process in or incidental to the opening of *asbestos*.

Approved means approved for the time being in writing by the Chief Inspector of Factories.

Breathing apparatus means (1) a helmet or facepiece with necessary connections by means of which a person using it breathes air free from

[1] Terms to which defined meanings are given are printed throughout in italics.

dust, or (2) any other *approved* apparatus.

Duties

It shall be the duty of the occupier to observe Part I of these Regulations.

It shall be the duty of every person employed to observe Part II of these Regulations.

Part I

Duties of Occupiers

1. An exhaust draft effected by mechanical means which prevents the escape of *asbestos* dust into the air of any room in which persons work, shall be provided and maintained for:

a. Manufacturing and conveying machinery, namely:

i. *Preparing*, grinding, or dry mixing machines.

ii. Carding, card waste-end, ring spinning machines, and looms.

iii. Machines or other plant fed with *asbestos*.

iv. Machines used for the sawing, grinding, turning, abrading, or polishing, in the dry state, of articles composed wholly or partly of *asbestos*.

b. Cleaning and grinding of the cylinders or other part of a carding machine.

c. Chambers, hoppers, or other structures into which loose *asbestos* is delivered or passes.

d. Workbenches for *asbestos* waste sorting or for other manipulation of *asbestos* by hand.

e. Workplaces at which the filling or emptying of sacks, skips or other portable containers, weighing, or other process incidental thereto which is effected by hand, is carried on.

f. Sack cleaning machines.

Provided that this Regulation shall not apply (i) to a machine or other plant which does not give rise to *asbestos* dust, or is so enclosed as to prevent escape of *asbestos* dust into the air of any room in which persons work; or (ii) where the *asbestos* is so wet or so treated with grease or other material as to prevent the evolution of dust; or (iii) to the making or repairing of insulating mattresses; or (iv) to the mixing or blending by hand of *asbestos*.

2*a*. Mixing or blending by hand of *asbestos* shall not be carried on except with an exhaust draft effected by mechanical means so designed and maintained as to insure as far as practicable the suppression of dust during the processes.

b. In premises which are constructed or reconstructed after the date of these Regulations the mixing or blending by hand of *asbestos* shall not be done except in a special room or place in which no other work is ordinarily carried on.

3*a*. The making or repairing of insulating mattresses composed wholly or partly of *asbestos* shall not be carried on in any room in which any other work is done.

b. In every room in which the making or repairing of insulating mattresses is carried on:

i. Adequate exhaust and inlet ventilation in accordance with arrangements to be *approved* in each case shall be provided and maintained.

ii. No person other than those engaged in filling, beating, or leveling shall be present while such processes are being carried on and work shall not be resumed in the room after filling, beating, or leveling, for at least ten minutes.

iii. The floors and benches shall be kept damped so as effectually to prevent dust arising therefrom.

iv. The covers shall be effectually damped immediately after being cut out and, in the case of fiber filled mattresses, shall be kept damp while filling, beating, or leveling is being carried on.

4*a*. Storage chambers or bins for loose *asbestos* shall, in the case of premises constructed or reconstructed after the date of these Regulations, be effectually separated from any workroom and, in the case of other premises, be effectually separated from any workroom in which the *asbestos* is not required for the purposes of any process carried on in the room.

b. Chambers or apparatus for dust settling and filtering shall not be allowed in any workroom.

c. Arrangements shall be made to prevent *asbestos* dust discharged from exhaust apparatus being drawn into the air of any workroom.

5. All machinery used in *preparing*, grinding of *asbestos*, carding, card roller cleaning and grinding, and sack cleaning, and all card waste-end machines, lattices, elevators, chutes, and conveyors shall be so constructed and maintained that dust or débris containing *asbestos* cannot escape from any part thereof other than dust removed by an exhaust draft provided in accordance with Regulation 1.

6*a*. Cleaning by hand, of the cylinders (including the doffer cylinders) of a carding machine, shall not be done while any person other than those performing or assisting at the cleaning is present.

b. On and after Sept. 1, 1932, such cleaning as aforesaid shall not be done by means of hand strickles or other hand tools.

7*a*. In every room in which any of the requirements of these Regulations apply:

i. The floors, workbenches, and plant shall be kept in a cleanly state and free from *asbestos* débris and suitable arrangements shall be made for the storage of *asbestos* not immediately required for use.

ii. The floors shall be kept free from any materials, plant, or other articles not immediately required for the work carried on in the room, which would obstruct the proper cleaning of the floor.

b. Every room as aforesaid shall be adequately lighted.

8*a*. A sack which has contained *asbestos* shall not be cleaned by hand beating but by a machine, complying with Regulations 1 and 5.

b. All sacks used as containers for the transport of *asbestos* within the factory shall be constructed of impermeable material and shall be kept in good repair.

9*a*. All ventilating plants used for the purpose of extracting or suppressing dust as required by these Regulations shall at least once in every six months be thorougnly examined and tested by a competent person and any defect disclosed by such examination and test shall be rectified forthwith.

b. A Register containing particulars of such examination and test and the state of the plant and the repairs or alterations (if any) found to be necessary shall be kept, and shall be available for inspection by any of His Majesty's Inspectors of Factories.

10. A *breathing apparatus* shall be provided for every person employed:

a. In chambers containing loose *asbestos*.

b. In cleaning dust settling or filtering chambers or apparatus.

c. In cleaning the cylinders, including the doffer cylinders, or other part of a carding machine by means of hand strickles.

d. In filling, beating, or leveling in the manufacture or repair of insulating mattresses.

11. There shall be provided and maintained for the use of all persons employed in the cleaning of dust settling and filtering chambers, tunnels, and ducts, suitable overalls and head coverings.

12. A young person shall not be employed in or in connection with the manufacture of insulating mattresses, in mixing or blending of *asbestos* by hand, in sack cleaning, in chambers or apparatus for dust settling or filtering, in chambers containing loose *asbestos*, or in stripping or grinding the cylinders including the doffer cylinders or other part of a carding machine.

Provided that nothing in this Regulation shall affect any young person so employed at the commencement of these Regulations.

Part II

Duties of Persons Employed

13. No person employed shall wilfully or negligently disregard any directions given him for the purpose of securing the observance of these Regulations or otherwise for the prevention of unnecessary dust.

14. Every person employed shall make full and proper use of the appliances provided for any of the purposes of these Regulations.

15. No person shall misuse or wrongfully interfere in any way with any appliance provided in pursuance of these Regulations.

16. Every person employed at work specified in Regulation 10 shall wear and make proper use of the *breathing apparatus* provided in pursuance of that Regulation.

17. Every person employed at the work specified in Regulation 11 shall wear the overall and head covering provided in pursuance of that Regulation.

Notification of Industrial Diseases. Statutory Requirements.

Reprinted from Correspondence, Brit. Med. Jour., Jan. 16, 1932, vol. 1, p. 118.

Sir:

Many medical men in Great Britain are, I am afraid, unaware of their statutory obligation to notify certain industrial diseases. I may quote two recent examples in regard to toxic jaundice, one a series of cases due to tetrachlorethane, and the other a series due to arseniuretted hydrogen. Only one of the cases was notified by a medical practitioner. In the series due to arseniuretted hydrogen notification of the earliest case would have led to the adoption of measures which might, it is anticipated, have prevented the occurrence of subsequent cases, including two deaths. This serious result alone seems to be ample justification for asking you to allow me to draw the attention of the profession to the very important statutory requirement of notification of industrial poisoning under the Factory and Workshop Acts, 1901 to 1920, and Lead Paint (Protection against Poisoning) Act, 1926.

Every medical practitioner attending on, or called in to visit, a patient whom he believes to be suffering from any of the following:

Lead poisoning
Phosphorus poisoning
Arsenic poisoning
Mercurial poisoning
Carbon bisulphide poisoning
Aniline poisoning
Chronic benzene poisoning
Anthrax
Toxic jaundice
Epitheliomatous ulceration, or
Chrome ulceration

contracted in any factory or workshop, is required by Section 73 of the Factory and Workshop Act, 1901, under penalty, to notify the case forthwith to the Chief Inspector of Factories, Home Office, London, S. W. 1; and by Section 3 of the Lead Paint (Protection against Poisoning) Act, 1926, he is also required to notify lead poisoning contracted by any person employed in, or in connection with, the painting of any building, whether or not that building is a factory or workshop, unless it has already been so notified; and he is entitled to a fee of 2s. 6d. for so doing. Forms for notification will be supplied on application to the Chief Inspector of Factories, Home Office, S. W. 1.

JOHN C. BRIDGE.

H. M. Senior Medical Inspector of Factories

January 11.

INDUSTRIAL ECZEMA AND COMPENSATION. *R. L. Mayer. Abstr. as follows from Zentralbl. f. Gewerbehyg., Oct., 1931, N. S. vol. 8, pp. 253–257, in Bull. Hyg., Feb., 1932, vol. 7, p. 84.*

The author (working in Jadassohn's laboratory, Breslau), in dealing with the difficulty often experienced in deciding whether or not a given case is industrial, takes the view that whatever the external exciting cause, the subsequent eczema is the manifestation of an idiosyncrasy or hypersensitiveness to it. He regards it as similar to hay fever, asthma, urticaria, and reaction to serum. A correct decision is difficult only in chronic recurring cases, which he still looks upon in probably all cases as due to an external exciting cause which is not looked for carefully enough. He cites as the three typical categories: (1) an eczema, as the simplest case, developing once at work, healing quickly, and not recurring even though a return to work is made; (2) cases in their initial stages similar to (1) but recurring at shorter or longer intervals on resuming work. These are cases of specific sensitization to the external agent which can be proved to be so by the Jadassohn skin test. The variations in exacerbation are due to variations in hypersensibility if contact with the external agent has been unchanged. (3) This category includes cases (the most difficult to decide) where even after removal from the original exciting cause, the eczematous condition continues. Here gradually a non-specific, polyvalent sensitiveness of the skin has been set up to any and every excitant. He concludes that in none of these cases can one ever ride off on the theory of an idiopathic eczema.—T. M. L.

REPORT OF THE DEPARTMENTAL COMMITTEE AS TO CERTAIN PROPOSED EXTENSIONS OF THE SCHEDULE OF INDUSTRIAL DISEASES INCLUDED FOR

WORKMEN'S COMPENSATION. *H. M. Stationery Office, 1932.*

Three subjects are reported upon. In the first the Committee recommends that compensation be paid while a workman is undergoing treatment for a localized new growth of the skin, papillomatous or keratotic, due to mineral oil, caused by self-acting mules in the process of cotton spinning. Such new growth would not of itself incapacitate; but it needs treatment, usually by operative means. The period of incapacity due to such treatment is seldom likely to exceed a fortnight. This recommendation extends the conditions under which a claim can be made for mule spinners' cancer; but it should be specifically limited to workmen employed as minders or piecers in connection with the process of cotton spinning by means of self-acting mules.

The second subject considered deals with turpentine poisoning, concerning which the evidence did not establish the existence of chronic turpentine poisoning as a condition that can be recognized. Such symptoms as nausea and colic due to the inhalation of turpentine fumes cause incapacity for so short a period as not to justify the inclusion of such indispositions within the schedule of diseases.

The third subject was that of dope poisoning, which as a heading has become unnecessary, owing to the fact that poisoning by tetrachlorethane is separately included in the schedule of diseases. No other particular solvent has been established as causing poisoning, even though further experience may reveal a definite group of symptoms resulting from exposure for long periods to a particular constituent; but the widespread use of cellulose lacquers containing such solvents has only developed in recent years. The Committee states that it is considering further questions which have also been referred to it.—E. L. C.

RECOMMENDATIONS TO GOVERN CONDITIONS WHEN INSTALLING AND ORGANIZING INDUSTRIES WHEREIN RADIOACTIVE BODIES ARE MANIPULATED. *C. Regaud and R. Perroux. Méd. du travail, March, 1932, vol. 4, pp. 38–44.*

A code of regulations is sketched out to guard workers from danger arising from exposure to radioactive bodies during the manipulation of the raw products or more concentrated extracts. Danger may occur either to the exposed parts of the body or to the blood forming organs, or through inhalation or ingestion of radioactive dusts. Lead screens should be used to intercept the rays, and active ventilation to carry away the dust. The way in which these two lines of protection should be used is indicated for various processes. Medical supervision of the personnel is also recommended, with occasional microscopic examination of the blood.—E. L. C.

PROCEEDINGS OF THE SEVENTEENTH ANNUAL MEETING OF THE INTERNATIONAL ASSOCIATION OF INDUSTRIAL ACCIDENT BOARDS AND COMMISSIONS, HELD AT WILMINGTON, DEL., SEPTEMBER 22–26, 1930. *U. S. Bur. Labor Statistics, Bull. No. 536, April, 1931, pp. 353. Abstr. as follows in Bull. Hyg., Jan., 1932, vol. 7, pp. 19–20.*

These proceedings deal mainly with the compensation aspects of accidents and accident prevention; but a section is devoted to more particularly medical subjects, such as the industrial capacity

of handicapped individuals. Here the opinion is expressed that a man crippled through injury or disease, who realizes his handicap, tends to be faithful to the organization that gives him work, and so enables him to maintain his self-respect; hence he is likely to be useful not in spite of, but because of, his handicap, provided his occupation is suited to his capacity. But the discussion tended to turn upon the amount of risk which an employer undertook in engaging such persons. Closely allied was the question of rehabilitating the injured, so that they can function industrially. A further subject concerned the value of psychiatry to industry; here it was maintained that in fitting men for higher positions, and not only the laboring man to his work, psychiatry offers great advantages to those who are prepared to accept them. One of the most interesting papers discussed concerned the effects of chemical gases, especially those used in warfare. The subject is dealt with by H. L. Gilchrist, who tells of a series of careful experiments carried out, which are illustrated by six excellent plates. The other subjects discussed were the classification of heart disease from the standpoint of employment, and the health hazards connected with spray coating.—E. L. C.

MEDICAL ASPECTS OF WORKMAN'S COMPENSATION ACT. *M. S. Avidan. New Jersey Med. Soc. Jour., Feb., 1932, vol. 29, p. 143.*

ABSTRACT OF THE LITERATURE
OF
INDUSTRIAL HYGIENE

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GENERAL

REPORT OF THE MEDICAL RESEARCH COUNCIL FOR THE YEAR 1930–1931. *H. M. Stationery Office, 1932, pp. 153.*

Many interesting investigations, either completed or in course of progress, receive notice in this report, particularly with regard to advances in nutritional science. One section of the report deals entirely with researches into industrial health; here special mention is made of pulmonary diseases resulting from dust hazards in various industries, including hematite and anthracite mining, and asbestos manufacture. The subject of standardization of radiograph technic for pulmonary disease has been explored; and a scheme has been drawn up for investigating the physical state and chemical composition of atmospheric dusts as they occur in industry. Experimental work with animals upon the tissue reactions to dusts and their influence on the development of tuberculosis is progressing. Particular attention is being directed to the pathology of coal miners' lungs, especially with regard to the effects of anthracite dust. Another subject which continues to receive close attention is that of miners' nystagmus. A memorandum on the amount and quality of illumination required physiologically for work in coal mines is in course of preparation, and means are being investigated by which this standard of il-

lumination may be attained. Other industrial matters under investigation are within the scope of the Industrial Health Research Board, which is organized by the Medical Research Council; these subjects are dealt with annually in the report of that Board. —E. L. C.

TOWARDS THE ESTABLISHMENT OF A FACTORY INSPECTORATE IN CHINA. *C. Pônc. Internat. Labour Rev., May, 1932, vol. 25, pp. 591-604.*

The Chinese government, after placing upon its statute book an up-to-date Factory Act, perceived that steps must be taken in order to make the Act operative; for this purpose they asked advice from the League of Nations, by whom Mr. Pône and Adelaide Anderson were appointed as advisers. These investigators report upon the difficulties associated with regulating industrial conditions in China suddenly, according to European standards. They now advise progress by stages. At first the factory inspectorate, which is to become the central factory inspection department of the Chinese government, should be trained before commencing its duties; such training is already in progress. Then it should commence work gradually, first by visiting factories in order to meet the managers, supply them with registers, and find out the number of persons employed. Next it should turn its attention to health and safety in order to amend the dangers already disclosed during the first stage, particularly with regard to the investigation of industrial accidents. The third stage should be concerned with the provisions of the Act relating to hours of work, while information should be gathered regarding all points dealing with this wide field of control. Since, at the commencement, immediate application of provisions relating to the age of admission to employment would be nearly impossible to enforce, while the energies of the inspectors would be entirely absorbed without any great benefit to progress, enforcement of these provisions is placed at a late stage of the activities of the inspectorate.

The first area to be thoroughly organized will be that of Shanghai; but here particular local difficulties are found on (*a*) Chinese territory, (*b*) the International Settlement, and (*c*) the French Concession. Nevertheless, by bringing the authorities together an agreement was arrived at that only one system of regulations throughout the industrial district of Shanghai should be adopted, and controlled by the inspectorate of the Chinese government, although this inspectorate would report not only to its own government but to the authorities of the International Settlement or the French Concession. This report is essentially reasonable, and indicates how, by learning to walk before attempting to run, the progress of industrial hygiene in China may be established on a sound footing.—E. L. C.

ANNUAL REPORT ON THE ADMINISTRATION OF THE INDIAN FACTORIES ACT IN BENGAL FOR THE YEAR 1930. *J. B. McBride. Calcutta, Bengal Secretariat Book Depot, 1931, pp. 94.*

This annual report should be considered together with the Report of the Royal Commission on Labour in India,

abstracted in THIS JOURNAL, February, 1932, p. 25. In the province of Bengal rather over half a million operatives only are employed in factories. Industrial development is not a great factor in the agricultural life of the people. Three-fifths of these operatives are employed in the jute industry. Supervision of health is not easy, since the workers tend to go back home if ill. Thus, without doubt, lead poisoning occurs at printing presses, but its prevalence cannot be estimated, since those affected with colic pain or other symptoms disappear from the factory and all trace of them is lost. The Factory Acts contain no provision to protect adult males exposed to a lead risk; the Acts are specially concerned with women and young persons under 18.

Employers are particularly concerned with the housing and living conditions of their operatives. The usual type of accommodation consists in bamboo huts thatched with grass, but some prefer huts with mud walls and corrugated roofs. The accommodation is still primitive and is governed by superstitions; if a death occurs, it is customary to set fire to a line of houses and migrate to newly built huts, in order to drive away evil spirits. These primitive customs are found together with modern welfare organizations, in which provision may be made for child welfare and crèches for the children of women employees, and where medical attention is free for the workers and a fully equipped modern hospital may be provided. Certifying surgeons are appointed to determine that children are at least 12 years of age and physically fit for employment. Health records are nearly impossible to collect; nevertheless, over employment cannot do much harm to workers who receive a week's holiday each month, and two or three days' holiday each working week. Information is given regarding accidents, the majority of which appear in Bengal to be due more to the personal factor than to the absence of safeguards.—E. L. C.

SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

INDUSTRIAL CANCER. *G. C. Andrews and C. W. McNitt. Abstr. as follows from Med. Clin. No. America, 1931, vol. 14, p. 1507, in Am. Jour. Cancer, May, 1932, vol. 16, p. 554.*

This is a very general review of the subject of industrial cancer. Numerous writers are quoted and a bibliography is appended.

OCCUPATIONAL INCIDENCE OF PRIMARY LUNG CANCER. *W. Brockbank. Abstr. as follows from Quart. Jour. Med., Jan., 1932, vol. 1, p. 31, in Jour. Am. Med. Assn., April 23, 1932, vol. 98, p. 1510.*

Brockbank reports that an investigation of the occupations in 898 cases of primary lung cancer collected from the literature suggests that the laboring classes predominate, although no one occupation stands out. Poison war gas, tobacco smoking, road dust, and motor car fumes are all possible etiologic factors. The occupations of sixty-two patients were investigated in

some detail. Nine (14.5 per cent.) seemed to have definitely dusty jobs, and eighteen (29 per cent.) worked among gases and fumes. Four were badly gassed in the war, and nine smoked excessively. A plea is made for more detailed investigation of the occupations of patients suffering from this disease.—C. K. D.

CLINICAL AND RADIOLOGIC OBSERVATIONS ON THE DEVELOPMENT OF JOACHIMSTAL BRONCHIAL CARCINOMA. *A. Beutel and A. Woldrich. Abstr. as follows from Ztschr. f. Krebsforsch., 1931, vol. 34, p. 109, in Am. Jour. Cancer, May, 1932, vol. 16, p. 555.*

The authors report the clinical and radiologic observations on a patient from the Joachimstal district with bronchial carcinoma. He was 45 years old and had been a worker in the Joachimstal region for twenty-six years, except during the war. For ten years he had had gradually increasing discomfort in the chest, associated with a productive cough. At the time of the first examination, in September, 1929, the patient appeared in good health. Physical and X-ray examination of the chest showed no pathologic changes, and the patient was discharged with a diagnosis of secondary anemia. When seen in January, 1930, he had lost 7 kilos (15.4 pounds) in weight, and appeared ill. The cough had increased in severity and the sputum contained small amounts of blood. At this time X-rays showed a round, homogeneous, sharply circumscribed shadow in the lower lobe of the right lung. The possibility of bronchial carcinoma was discussed, but the patient was discharged with the diagnosis of postpneumonic fibrosis. At the last examination, in January, 1931, all of the symptoms had increased in severity, fever was present, and he was emaciated. X-ray examination showed an increase in size of the shadow in the lower lobe of the right lung which had been observed one year previously. Contrast media injected into the bronchus leading to the right lower lobe showed a circumscribed destructive and stenosing process involving two adjacent primary bronchi. At this time it was possible to make the diagnosis of carcinoma of the lung with bronchial stenosis.

Several pages are devoted to a discussion of these clinical and X-ray findings, and a comparison with the other reported cases of Joachimstal lung carcinoma is made. The conclusion is drawn that the inhalation of some gaseous element plays an etiologic rôle in the development of these tumors.

CHRONIC CARDIAC LUNG IN INTENSE ANTHRACOSIS. *P. Preuschoff. Deutsch. Arch. f. klin. Med., Dec. 8, 1931, vol. 172, pp. 198–206.*

INVESTIGATION OF DISEASE AMONG LOOKING-GLASS GRINDERS AND POLISHERS. *Koelsch and Lederer. Abstr. as follows from Arch. f. Gewerbepath. u. Gewerbehyg., 1931, vol. 2, pp. 618–640, in Bull. Hyg., April, 1932, vol. 7, p. 211.*

The authors undertook detailed medical examination of 174 grinders and polishers of looking-glasses in Fürth, the largest center of the industry. Tuberculosis of the lungs has long been recognized as especially prevalent and has been known as the "Fürth disease"

or "Fürth lung," although typical conditions suggestive of association with inhalation of dust were absent. Clinically seven, or 4 per cent., were found to be tuberculous. Radiographs were taken of eighty-nine (51 per cent.) persons showing clinical signs, in fifty-four (60 per cent.) of whom the findings were negative. Twelve and three-tenths per cent. (principally grinders) showed dust aggregations in the lung tissue, and they complained of some subjective symptoms, pain, dyspnea, cough, and expectoration. In 4.5 per cent. these aggregations were associated with tubercular deposits. Uncomplicated tuberculosis was found in eighteen (10 per cent.).

The authors insist that the findings are quite different, both in localization and in appearance, from the changes they had previously noted in sandstone, porcelain, and cement workers. So characteristic is the condition that they name it "glass grinders' lung." Four X-ray photographs illustrate the paper.

The authors do not regard the condition produced as a severe one; it in no way resembles silicosis. The dust aggregations only show themselves after from ten to twenty years' employment. —T. M. L.

THE PREVENTION AND TREATMENT OF INDUSTRIAL RHEUMATISM. *M. B. Ray. Jour. State Med., May, 1932, vol. 40, pp. 255–273.*

A sketch is given of the clinical field covered by the term rheumatism, and of the conditions which favor it. Then follows a plea for physiotherapy with hot air, vapor, and hot water applied locally and generally, together with massage. Little is said as to prevention, and no facts are adduced as to the industrial distribution of rheumatic conditions. The title of the article is rather misleading.—E. L. C.

THE ORGANISATION OF TREATMENT FOR INDUSTRIAL RHEUMATISM. *A. R. Neligan. Jour. State Med., May, 1932, vol. 40, pp. 274–299.*

A good case is put forward for organizing treatment for chronic rheumatism. This treatment is specially given at spas, but should be set up in industrial areas. The association of industries with rheumatism is taken for granted; but no evidence is called to establish that rheumatism is more an industrial than a social problem. This article is useful for anyone desiring to equip a rheumatic clinic for industrial workers.—E. L. C.

THE CONTROL OF INDUSTRIAL RHEUMATISM. *W. S. C. Copeman. Jour. State Med., June, 1932, vol. 40, pp. 311–323.*

Rheumatism causes much incapacity, socially and industrially. Its prevention calls for study as to its causation, upon which more light might be thrown by a study of its industrial incidence than by labeling it "industrial" rheumatism. Indeed, women predominate over men sufferers; and a rheumatic family history is common. Its treatment calls for town clinics and spa hospitals. The author speaks with expert knowledge of rheumatic manifestations and treatment, and with less acquaintance with industrial environment.—E. L. C.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

MEASUREMENT OF THE FLOW OF GASES AND VAPORS. *B. F. Dodge. Indust. and Engin. Chem., March, 1932, vol. 24, pp. 261–273.*

The steadily growing demand by industry for more precise control of processes has greatly stimulated the study of methods of measurement and control, and has resulted in many improvements in apparatus and technic. It is the purpose of this paper to review some of the modern methods for continuously measuring and recording gas flow which are in extensive use in industry. The term "gas" will be understood to include condensable vapors, such as steam, but the discussion will refer more specifically to gases that are not condensed at ordinary atmospheric conditions.

HEALTH IN THE ARTIFICIAL SILK INDUSTRY. *P. Cazeneuve, A. Morel, and H. L. de Leeuw. Bull. Acad. de méd., 1932, vol. 107, pp. 812–819.*

Various processes are employed rof making artificial silk. These are described. In each case the thread is made by passing a colloidal solution of cellulose into a neutralizing fiuid which precipitates it; the solution is passed into the fluid through fine tubes, varying in size according to the thread to be produced. One group of processes includes either salts or oxides of cellulose dissolved in organic solvents; the solvents and materials used are so costly that precautions are taken to recover them; hence no exposure to harmful fumes occurs. In 1931 only 2,620 tons of artificial silk, out of a total of 213,000 tons, were so made. Another process concerns a colloidal solution of hydrocellulose in a copper-ammonia fluid; here trouble arises from ammonia fumes when the thread is formed, owing to burns from spray and to conjunctivitis. Only 5,500 tons of artificial silk were so made. Most of it is made, 190,000 tons, by the viscose process in which hydrocellulose is dissolved with the sodium salt of dithiocarbonic acid; it is then called xanthogenate of cellulose. Risk here arises from escape of carbon bisulphide and sulphuretted hydrogen; and details are given of each step in the process. The conclusion is that with proper care all risk to health can be entirely controlled by attention to localized exhaust ventilation.—E. L. C.

OCCURRENCE AND DETERMINATION OF ALUMINUM IN FOODS. I. DETERMINATION OF ALUMINUM IN ORGANIC MATERIALS. *G. J. Cox, E. W. Schwartze, R. M. Hann, R. B. Unangst, and J. L. Neal. Indust. and Engin. Chem., 1932, vol. 24, pp. 403-405.*

Idem. II. ALUMINUM CONTENT OF FOODSTUFFS COOKED IN GLASS AND IN ALUMINUM. *G. D. Beal, R. B. Unangst, H. B. Wigman, and G. J. Cox. Ibid., pp. 405-407.*

Abstracted as follows in Chem. Abstr., May 20, 1932, vol. 26, pp. 2796-2797.

I. Aluminium in organic tissues, after ashing by ignition, as preferable to the wet method which adds aluminium through the reagents, is determined colorimetrically as a lake with aurinetricarboxylic acid. An apparatus for lake development and detailed description of improvement of technic

and precision over previous methods are given. Iron, which interferes in colorimetry, is not completely removed by centrifuging, but by adsorptive filtration through two papers; the mercaptoacetic acid test becomes negative. Silica interference is sufficiently removed by dehydration.

II. Clean aluminium utensils are shown to be attacked to an insignificant degree by chemically neutral foods. Acid foods and those containing soda dissolve small quantities of aluminium. Sugar decreases corrosion of aluminium. The largest amount found was 118 parts per million in apple butter, cooked six and one-half hours. From a balanced diet one might get 12 mg. of aluminium daily if all foods are cooked in aluminium, or 2.1 parts per million from vessels.—P. D.

RECENT ADVANCES IN THE RECOGNITION AND TREATMENT OF POISONING. IV. ARSENICAL POISONING. *E. Leschke. München. med. Wchnschr., Jan. 8, 1932, vol. 79, pp. 57-62.*

The occurrence, symptomatology, and pathologic changes in arsenical poisoning are reviewed. Poisoning with both inorganic and organic arsenic compounds is discussed.—L.T.F.

CARBON MONOXIDE AND ITS RELATION TO AIRCRAFT. *J. J. White. Abstr. as follows from U. S. Nav. Med. Bull., April, 1932, vol. 30, p. 151, in Jour. Am. Med. Assn., June 4, 1932, vol. 98, p. 2023.*

White calls attention to the fact that carbon monoxide, a product of incomplete combustion, is present in the exhaust of all types of airplanes. In some types of planes, depending on the type of exhaust leads, fuselage, and so on, this gas is carried back to the cockpits of the plane in sufficient concentration to result in as much as 15 per cent. saturation of the blood of the pilot and other occupants of the plane. Although the highest saturation of blood obtained during the author's investigation (15 per cent.) is not sufficient to render a person unconscious or to be a direct cause of a crash, it is known that the absorption of even minute amounts of carbon monoxide is highly undesirable, owing to the probable adverse effect on the efficiency of the pilot. The fact that exposure to a low concentration over a long period is more harmful than a brief exposure to a very high concentration increases the importance of eliminating all traces of carbon monoxide. Comparatively simple and inexpensive modification of the exhaust leads has eliminated carbon monoxide from the area where it is absorbed by the pilot or other occupants of the plane.—C. K.D.

CARBON MONOXIDE POISONING. *H. H. Kretzler. Northwest Med., March, 1932, vol. 31, p. 132.*

CYANIDE POISONING. *A. R. Smith. Abstr. as follows from N. Y. State Dept. Labor, Indust. Bull., 1932, vol. 11, p. 169, in Canadian Med. Assn. Jour., June, 1932, vol. 26, p. 754.*

The poisonous properties of hydrocyanic acid gas are well known. Smith says that a concentration of 100 parts per million is dangerous. The action of the gas deprives the tissues of their power to absorb oxygen. A considerable number of deaths have occurred in the process of fumigating houses

and particularly ships, but in industry where cyanides are extensively used cases of industrial poisoning are infrequent, and the general impression is that the salts of hydrocyanic acid can be used with impunity. The hazard of mixing the cyanides with acid is recognized, but the possibility of chronic poisoning from exposure to the cyanides as such is not generally admitted. Smith cites three cases, one a machinist using cyanides for casehardening, one a gold plater, and the third a casehardener. These men exhibited symptoms related to the gastro-intestinal and nervous systems. The first man became dizzy, nauseated, and semiconscious after exposure to the fumes of heated potassium cyanide. The second man was probably exposed to the fumes of hydrocyanic acid. He was seized with abdominal pains and convulsions which recurred on his return to work after a vacation of ten days. The third man developed a paralysis of the arms and legs. His job was to plunge steel objects into a pot of molten potassium cyanide for the purpose of hardening them.

These three cases point strongly to hydrocyanic acid or its salts as the causative agent in a chronic disease which in one case resulted in complete disability.

A Contribution to the Clinical Picture of Poisoning through Dimethylamidoazobenzene. *M. Agol. Gigiena, bezopasnosti i patologia truda, 1931, no. 3, pp. 39-43. (Translation of German Summary, pp. 43-44.)*

The author has studied three cases of poisoning by dimethylamidoazobenzene in three workmen in a chemical factory. The workmen had been employed at the trade from four to fifteen and one-half years, and had always worked with azo dyes (but never complained of poisoning). Within two weeks after they began work with dimethylamidoazobenzene, they all became ill. The poisoning showed itself suddenly—through intense itching and eruption over the entire body, through temperature rise to from 38.6 to 38.9°, and by increasing edema of the face and forearms. Blood examination showed a definite eosinophilia (which disappeared at the same time that the skin symptoms subsided), moderate lymphocytosis and levo-displacement of neutrophils. The Pirquet test was made with various azo dyes but showed a definitely positive reaction with dimethylamidazobenzene only. As to the remaining organs —no visible symptoms were established which could be accounted for by the poison present.

M., a patient, spent twenty-two days in the clinic after which he returned to his work, but did not deal with dimethylamidoazobenzene. Nine days later he came back to the clinic with somewhat less marked phenomena. After several days' stay in the clinic he received a month's leave of absence. After he returned to work an eruption occurred again, which persisted for a week and a half, and then gradually disappeared. Since that time, during the course of five months, no skin symptoms have been noted; however, the Pirquet test with azo dyes after this time had elapsed was positive with dimethylamidoazobenzene.

A similar picture of the illness was found in the cases of two other workmen. It must be noted that the two

workmen in whom the morbid symptoms reappeared after a return to work, had put on the same work garb they wore before the illness—that is, when they worked with dimethylamidoazobenzene.

The writer believes that in the cases described an allergy to dimethylamidoazobenzene was present; in the control cases [five workmen who never dealt with this dye and workmen who had worked with it but were never (five men) or only slightly (three men) poisoned] the Pirquet test was negative with dimethylamidoazobenzene.—A. M.

INJURIES DUE TO LACQUER. *P. Moreau. Bull. Soc. méd.-chir. Indochine, 1932, vol. 10, pp. 149-155.*

Japanese and Tonkin lacquers are known to cause skin troubles. They are obtained from the juice of the Rhus genus of trees. Two men, caulking a boat in open sunshine, sought treatment next morning with the exposed skin of the forearms, face, and neck acutely inflamed; the hands escaped owing to gloves. Midday they were both carried back to the hospital on stretchers; one was in a coma and the other had an epileptiform seizure. Prompt bleeding relieved symptoms; but one remained obtuse until the next day; while the other became maniacal in the night. The next day, except for the dermatitis, both had recovered. Lacquer poisoning is discussed. In these cases absorption by the air passages of fumes generated by the hot sun was the factor in starting the general symptoms. Albuminuria was present; and the condition was associated with functional blocking of the renal epithelium.—E. L. C.

THE COLOR OF THE SKIN AND EXPERIMENTAL TAR CANCER. *T. Suzuki. Abstr. as follows from Virchows Arch. f. path. Anat., 1930, vol. 277, p. 139, in Arch. Dermat. and Syph., May, 1932, vol. 25, p. 937.*

The proportion of cancers that followed the application of tar to the skin was greater in white mice and rabbits than in black animals of the same species. In animals with skin of mixed colors, *i.e.*, with black and white spots, tar cancers developed more frequently in the white spots than in the black ones. The author concludes that the color of the skin is an important predisposing factor in experimental tar cancer.

DUST HAZARDS AND THEIR EFFECTS

PNEUMONOKONIOSIS. *A. Rainer. Abstr. as follows from Wien. klin. Wchnschr., July 31, 1931, vol. 44, p. 991; Aug. 7, 1931, p. 1025, in Am. Rev. Tuberc., May, 1932, vol. 25, p. 58.*

This is a review of the literature on pneumonokoniosis, including its experimental aspects. The author adds the reports of twelve cases of which the postmortem findings only are reported. The conclusion is reached that the silicotic nodules are caused (1) by blocking the lymphatics, (2) by interstitial pneumonic processes, (3) by focalized, chronic pneumonic processes, and (4) by alterations in the vessel wall. It remains still an open question whether pure silicosis, without the advent of tuberculosis, may produce large nodular lesions.

THE TECHNIQUE OF EXPERIMENTAL PNEUMOCONIOSIS. *E. H. Kettle and R. Hilton. Lancet, June 4, 1932, vol. 1, pp. 1190-1192.*

Many experiments have been carried out in which animals have been exposed to a dusty atmosphere in order to study the effects of dust upon the lungs. Such experiments, however, are tedious to carry out and are associated with many experimental difficulties. The authors now recommend a simpler way of getting the dust into the lungs, by introducing suspensions of particulate matter by way of the trachea. The trachea is opened, and a suspension of sterile normal saline containing the dust under investigation is then injected under gentle pressure. Both rabbits and guinea-pigs tolerate the procedure well. All trouble with a dusting plant is thus avoided. The introduction of the dust suspension causes no trauma of the pulmonary tissue; but lesions which appear to be quite characteristic of dust irritation follow in due course. Nevertheless, time is an essential factor in the reaction. Figures are given wherein nodular collections of phagocytes appear more than a year after the injection, while characteristic early silicotic nodules are seen some twenty months after the experiments had started. Pursuance of this technic should simplify the experimental study of the pneumonokonioses.—E. L. C.

SPECTROGRAPHY APPLIED TO THE HISTOLOGIC EXAMINATION OF MINERAL PNEUMONOKONIOSES. *A. Policard and A. Morel. Méd. du travail, May, 1932, vol. 4, pp. 56–64.*

An inquiry is reported during which spectrography was used for chemical analysis of the dust content of lungs, as seen under the microscope. This method consists in throwing a spark of high frequency on the lung section, and obtaining a spectrum in ultraviolet by using a quartz spectrograph. The spectrum contains rays characteristic of the dust elements present. A number of lungs were examined by this method, some from miners who had died of tuberculous silicosis, some from coal miners exposed only to coal dust, some from workers exposed to a silica dust hazard, and others from tuberculous subjects with no dust exposure during life. The investigations brought out that healthy lung tissue does not show the presence of silicon; caseous nodules are always very poor in mineral elements; but silicotic nodules always contain calcium, magnesium, silicon, and iron in considerable amount. Anthracotic nodules also contain these minerals, so that any distinction between anthracosis and silicosis among miners cannot be drawn. The method of investigation used is one of considerable interest.—E. L. C.

PNEUMONOCONIOSIS AND PULMONARY TUBERCULOSIS. *W. Gerlach. Deutsch. med. Wchnschr., Feb. 19, 1932, vol. 58, p. 283.*

INDUSTRIAL DUST AND PULMONARY TUBERCULOSIS. PART 3 (LIMESTONE, QUARTZ CHAMOTTE, CHAMOTTE, THOMAS SLAG, WHITE LEAD, COTTON TEXTILE DUSTS, AND KÜHN'S LUNG POWDER). *K. W. Jötten. Schrift a. d. Gesamtgeb. d. Gewerbehyg., N.S. no. 39, 1932, pp. 169. (Translation of Author's Conclusion, pp. 161–165.)*

A comparison of the results obtained with the dusts of limestone, quartz

chamotte, chamotte, Thomas slag, Kühn's lung powder, cotton, and lead shows that in rabbits' lungs there is a general agreement in the symptoms after daily exposure. The lead dust experiments, however, show considerably fewer lung changes and a much quicker removal of dust, probably owing to the ready solubility of lead dust in water containing carbonic acid.

The changes observed were those which Jötten and Arnoldi, as well as Jötten and Kortmann, have already described with the various dusts which they tested, with the exception of lime dust. Differences naturally developed depending on the harmfulness of the dust. Steel dust was found to cause the most severe changes; then followed Freiberg porcelain dust (high silica content), clay slate, and Selb porcelain dust (low silica but high aluminium oxide content). Cement, carbon, soot, and tobacco dusts produced less acute symptoms, and lime (calcium hydroxide) was almost without effect.

The reactions caused by quartz chamotte, Thomas slag, and limestone dusts were not essentially greater than those following the inhalation of cement dust. Experiments in the practical trades also coincide to a great extent with those which Jötten and Kortmann made in cement works and which it was possible to repeat with cotton dust in the textile factory. Cotton and chamotte dusts, like cement, carbon, and tobacco, lay near the neutral zone but cannot be called entirely harmless to the lungs, as can lead dust and especially lime dust, according to the findings of Jötten and Arnoldi.

True pneumonokoniosis could not be produced experimentally with any of the dusts previously tested. Some development of connective tissue in the parts affected by the dust was observed with limestone and cotton dusts in the longest experiments, especially in the studies in industry, and also with quartz chamotte, chamotte, and Thomas slag, in experiments lasting about five months. Still longer periods of exposure to dust may lead to a definite result as in the earlier series of experiments carried out by Jötten and Arnoldi and by Jötten and Kortmann. The same order holds also in regard to the eventual promotion of experimental pulmonary tuberculosis. With the exception of white lead dust, which is harmless, dusts under investigation in the present study are, like cement dust, essentially neutral; quartz chamotte and chamotte dusts are, perhaps, somewhat less so than the others. In our animal experiments, however, especially in those with so-called immune animals which had been specifically treated, they have been found considerably less harmful than the porcelain and clay slate dusts used in earlier studies. In several of these experimental animals there were observed indurated tuberculous changes with gland-like alveoli such as Jötten and Arnoldi described in animals immunized against porcelain; these are perhaps a definite indication of an experimental tuberculo-pneumonokoniosis. Thomas slag was somewhat more favorable with respect to the spread of experimental pulmonary tuberculosis, a fact which in our opinion may be traced to the high content of caustic lime (about 50 per cent.).

Finally, Kühn's lung powder was

disappointing as a therapeutic measure, since inhalation for one hour a day for several months failed to have any effect on exudative pulmonary tuberculous processes; it did not even have a favorable influence on processes with an inclination to induration caused by inhalation of dust for a longer time. The results were considerably less satisfactory than those which Jötten and Arnoldi obtained with calcium hydroxide dusting.

The differences in the degree of injury produced in the lungs by these dusts were therefore not very great, in spite of the fact that the content of free crystalline silica, especially in quartz chamotte and chamotte dusts, was relatively high (between 57.74 and 77.3 per cent.) so that on the basis of earlier experiments, considerable injury to the lung tissue and greater promotion of the pulmonary tuberculous process might have been expected. Especially striking was the favorable effect noted in these experiments, as compared with the results obtained with porcelain and clay slate dusts which had somewhat lower silica content. It is therefore obvious that it is not always correct to assume that the harmfulness of a dust depends upon its content of free crystalline silica. The greater freedom from pulmonary tuberculosis with quartz chamotte and chamotte dusts in comparison with porcelain and clay slate dusts is probably due to the considerable admixture of aluminium oxide—between 19.1 and 20 per cent.

These apparently divergent experimental results of ours are, however, supported by findings reported in recent English literature. Here mention should be made of the observations of Smith and Collis on workers in ganister-clay-stone factories in Stirlingshire and Elland, whose tuberculosis mortality was below the average figure; and also of the findings of Heffernan who observed no silicosis and no unusual incidence of tuberculosis among Derbyshire stone workers, not even in trades where ganister bricks were manufactured from sand with 84 per cent. quartz and clay (fire clay). Wade, in his studies, had quite the reverse experience, corresponding to our experimental results with clay slate dust with a lower silica content. In the Gwyrfai district in northern Wales, where a similar dust is inhaled in the slate industry, he found a high tuberculosis death rate and a high incidence of cases of tuberculo-silicosis. Therefore the more favorable results in our animal experiments with quartz chamotte and chamotte and also the less favorable result with clay slate dust are confirmed by practical experience as well as by our own determinations in the dusty trades. The rather rare occurrence of pulmonary tuberculosis and tuberculo-silicosis among chamotte workers is admitted by most investigators; and the only question is whether with longer exposure to dust, more or less definite pulmonary disease can be assumed to occur. In order to answer this question it is necessary to have an accurate analysis of the so-called chamotte dust, especially with regard to Litinsky's classification.

The answer to the same question (silicosis?) is required also for limestone dust, especially as it is considered possible by sufficiently long inhalation and greater generation of dust to

produce a lung disease which is essentially less serious than true silicosis produced in the silica trades and which corresponds rather to the pulmonary disease due to cement dust, which produces only slight injury. These findings also are in accord with the experimental results of Beattie, Gardner and Dworski, and Iszard.

This comparison of limestone dust to cement dust agrees with our own experimental results, as well as with practically all the results reported in the literature. Therefore, on the basis of these findings limestone dust would be much better suited than clay slate dust for rock dusting of mines, particularly as it satisfies the requirements of mining authorities as communicated to us at the time of our investigation of the Wicking Works in Lengerich.

Our findings with Thomas slag dust are at a variance with Vollrath's scale of pulmonary hazard and the experimental results of Lubenau and of Cesa Bianchi, but are in agreement with those of K. B. Lehmann and practically all other investigators. Just as with cement, the high calcium oxide content causes free solubility of the dust in the tissue fluid of the lungs, thus leading to its early removal. Therefore the favorable influence on the tuberculous process, as we were able to observe it, especially in so-called immunized animals, corresponds with the favorable figures for pulmonary tuberculosis reported from practical experience by E. Beintker and others.

Our experiments with Kühn's lung powder failed to establish the favorable effect observed by Kühn—a result which we might have expected with a mixture of silicic acid, carbon, and some ferric oxide and clay, on the basis of our earlier experiences with carbon.

On the other hand, our results with white lead dusts, "Cerussa" and "Sulfobleiweiss-Wilhelmsburg," which are readily soluble in water, showed no lung injury and also no promotion of pulmonary tuberculosis. This is in agreement with the recent collection of English statistics on the incidence of pulmonary tuberculosis for the years 1921 to 1923, and with the communications of Ickert and of Roos regarding the absence of pneumonokoniosis among lead foundry workers and among printers.

Our experimental results regarding pulmonary tuberculosis from inhalation of cotton textile dust also agree with recent figures in England (1921 to 1923) and with the findings of a number of other investigators. Earlier reports showed a slight increase in fatal cases of pulmonary tuberculosis among these workers. This increase has been traced, however, to factors other than the inhalation of cotton dust—*i.e.*, the physical weakness of the workers, to the predominance of women living under pressing social conditions, and to tuberculous sources of infection. Naturally one cannot look with indifference upon the dust in the manufacturing and carding rooms which contains silica, in spite of the fact that there exists no information about true dusted lung in workers employed in such rooms. Too great a production of dust should be guarded against, however, especially in the cleaning of the machines.—F. H.

SILICOSIS: I. ADMINISTRATIVE AND CLINICAL. *J. A. Nixon. Bristol Med.-*

Chir. Jour., 1931, vol. 48, pp. 253–258.

Fibrosis of the lung is classified as (1) pure fibrosis, (2) tuberculosis becoming fibroid, and (3) fibrosis becoming tuberculous. For the most part fibrosis due to dust may be said to be caused by silicosis. Exposure to silica dust occurs occupationally in the following industries: refractories industries, sandstone, granite, slate, metal grinding, sandblasting of metals, pottery making, crushing silica, tin mining, hard heading work in coal mining, and the asbestos industry. Fibrosis is a chronic complaint, of which dyspnea on exertion is the first symptom; the absence of constitutional symptoms in an advanced case is notable. Acute cases are rare, but when they occur cyanosis is present with constitutional disturbances and pyrexia. Hemoptysis generally indicates tuberculous infection; but pleuritic pains appear early. Physical signs are seldom characteristic, and radiography is the most important aid to diagnosis. This article is short, but unusually clear and correct in the details it gives.—E. L. C.

Silicosis: II. Radiology and Pathology. *G. B. Bush. Bristol Med. Chir. Jour., 1931, vol. 48, pp. 259-272.*

Excellent illustrations giving radiographic detail accompany this article; even so the author apologizes for the loss of so much of the original detail in reproduction. Radiography helps to detect advancing silicotic fibrosis, which at first is little more than chronic lymphatic congestion with some bronchiolitis; later simple nodular dust fibrosis appears, and marks a definite silicotic stage. The appearance of any tuberculous infection, converting the condition into infective silicosis, can usually be detected. Individual cases show many variations in character and development, depending on the factors of time, intensity, and infection, as well as on the nature of the dust inhaled. Pathologic changes in the lymph nodes, present previous to dust exposure, also influence the rapidity of onset and progression of silicosis. Probably necrosis never takes place in silicotic nodules in the absence of superadded infection.—E. L. C.

Observations on Control of Silicosis in Industry in South Africa. *L. G. Irvine. Brit. Med. Jour., April 16, 1932, vol. 1, pp. 693-698.*

A concise account is given of the occurrence of silicosis in the gold mining industry of South Africa, where it became recognized at the commencement of the present century. Thereafter it was closely studied, and steps were taken to detect it and to control it. Two lines of activity are pursued, one medical and the other mechanical. The medical activities are directed at obtaining a healthy personnel of miners by initial examination, and at eliminating from this personnel, at subsequent periodic examinations held every six months, anyone showing signs of active tuberculosis. In these ways tuberculous infection among the men is minimized. The mechanical activities comprise suppression of dust wherever possible, either by so ordering the processes that the men are not exposed to dust which must be generated, as in blasting, which is allowed only at the end of the shift, or by preventing the generation of dust through the use of drills having an axial water feed. The way in which these various methods of

control have been introduced are indicated. The results upon the incidence of the disease are also shown; they are undoubtedly satisfactory. Men employed under modern conditions of dust control, who have also been medically examined on engagement, show far less tendency to contract dust trouble than do miners working under earlier conditions.

Three types of dust trouble are recognized: simple silicosis, wherein the effect of the silica dust on the lungs is the only condition present; infective silicosis, wherein a tuberculous element is also present, but the tuberculosis is not openly active; and silicosis complicated by open tuberculosis. These three types are progressively more serious. Simple silicosis may not incapacitate a man for many years, nor indeed injure his health seriously. On the other hand, when associated with open tuberculosis the disease is both incapacitating and particularly fatal. Moreover, either condition appears to activate the other. Radiography is used extensively for studying the condition, but it cannot be relied upon exclusively without a knowledge of the clinical condition present. The author considers that the experience gained may be of use to other occupations, but recognizes that dust trouble in other industries may present entirely new and distinct problems, for which other means of control may have to be devised.—E. L. C.

SILICOSIS AND PULMONARY TUBERCULOSIS. *J. C. Herrick. Med. Bull. Vet. Adm., Nov., 1931, vol. 7, p. 1063.*

THE INTERSTITIAL REACTIONS CAUSED BY VARIOUS DUSTS AND THEIR INFLUENCE ON TUBERCULOUS INFECTIONS. *E. H. Kettle. Jour. Path. and Bacteriol., May, 1932, vol. 35, pp. 395–405.*

A number of dusts suspended in normal saline solution and sterilized were injected into mice subcutaneously in order to study the reaction of tissues. Many dusts were used, including crystalline silica, dust from gold mines, shale, kaolin, asbestos, carborundum, oxide of iron, carbon, coal, and aluminium oxide. The substances tested fell sharply into two groups: (*a*) an active group, causing necrosis and pronounced cellular reaction; and (*b*) an inert group, which remains quiescent. Compounds containing silicon, such as crystalline silica, asbestos, and kaolin were found active; but carborundum, which is carbide of silicon, proved an exception since it was an inert substance in the tissues. This grouping accords with clinical observation in industries, since dusts in the active group, with the one doubtful exception of kaolin, are all known to cause pneumonokonioses.

The tendency of tubercle bacilli to grow in lesions produced by dust was studied by injecting into the circulation of the mice used an emulsion of living tubercle bacilli. Each animal acted as its own control because necrotic foci were first produced by using two different kinds of dust injected into either flank, some time before the bacilli were introduced. The bacilli were found sometimes in greater numbers at the necrotic site than in the lungs; but such infection never occurred apart from silica or silicates—*i.e.*, in the active dust lesions. A few bacilli were to be found in inert dust lesions, as might be expected, since they represent

injured parts of the body. Twelve excellent figures are given to demonstrate the type of reactions seen under the microscope. The study suggests that the body is adaptable to dust, and that the lung may tolerate a heavy load of inert particulate matter, the physical characters of which appear of little moment. When, however, the dust undergoes solution in the body fluids, with the production of soluble tissue poison, it becomes dangerous. This property may be demonstrated in the subcutaneous tissue with greater ease and rapidity than in the lung itself.—E. L. C.

OCCUPATIONAL INFECTIOUS DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

A Report on Tuberculosis Including an Examination of the Results of Sanatorium Treatment. *Reports on Public Health and Medical Subjects No. 64. A. S. Macnalty. H. M. Stationery Office, 1932, pp. 172.*

This report brings together in a useful way the present position with regard to tuberculosis. First the incidence of the disease is stated; here attention is drawn to the steady decline which has been taking place. Then a review is given of the present outlook upon the disease, particularly with regard to infectivity of the human and bovine forms. Next the influences exerted by the body are shortly summarized in regard to such factors as fatigue, injury, malnutrition, and alcohol. (This part of the report is perhaps too much condensed, and leaves upon the reader the impression that these factors are of less importance than they undoubtedly are.) The association of other diseases, such as insanity and influenza, with tuberculosis is also indicated. Then attention is drawn to external circumstances which favor tuberculous infection, such as overcrowding and the inhalation of silica dust, together with other occupational influences; here more space is devoted to asbestosis than to the far wider spread, and more important, influence of silicosis.

Dr. Macnalty is at his best when describing the state organization for attacking the disease, both on the preventive and on the curative side. Although methods of treatment are carefully outlined, the impression left is that prevention due to segregation of cases in sanatoriums is the most important side of our attack today upon the disease. The village settlement and its place in the scheme is clearly set out; it is satisfactory to learn that no child living in the training colony at Papworth has contracted any form of tuberculosis. The value of orthopedic schemes is discussed, and special methods in diagnosis and treatment receive adequate consideration. Probably the most interesting section is that devoted to tuberculosis in children, which is illustrated by two excellent diagrams. The conclusion of the whole report is that as surely as trade follows the flag, so does the tubercle bacillus. Native races living free in the open air do not know tuberculosis, but the number of these native tribes diminishes as civilization marches onward. Contact infection, industrial occupations, urbanization, overcrowding, poverty,

malnutrition—all favor the disease. A return to natural conditions, with fresh air, sunlight, and proper food, enables the human body to resist it. Nevertheless, as civilization is improving the standard of living and of hygiene, together with segregation of infectious cases, the disease is giving way, so that by co-ordinated progress along various paths tuberculosis is likely, at no distant date, to be combated successfully.—E. L. C.

OCCUPATIONAL AFFECTIONS OF THE SKIN AND SPECIAL SENSES

BAKERS' ECZEMA AND ITS CAUSES. *L. Teleky and E. Zitzke. Arch. f. Gewerbepath. u. Gewerbehyg., 1932, vol. 3, pp. 68-152.*

This important article is in two parts: the first, by Dr. Teleky, deals with changes in the milling industry and the working conditions of bakers; and the second part, by Dr. Zitzke, deals with the causes of bakers' eczema.

During the last ten years there have been great changes in Germany in the milling industry. Under pressure of competition from American flour, the German millers began during 1924 to 1926 to use bleaching methods and to add chemicals to the flour to improve its baking qualities. The public demand for white bread grew and the bakers found that flour to which "improvers" had been added gave more reliable results than the flour then sent out from the large mills, which, as it was milled from wheat grown in different parts of the world, had varying qualities. There are now a number of chemicals used in Germany for bleaching and improving flour. There are, however, some parts of Germany, especially Bayern and Schlesien, where owing to the use of rye flour the change to bleaching and the use of improvers has come in very slowly.

The commonest method of flour bleaching in Germany is by means of electric arc lamps, but chlorine gas and benzoyl peroxide are also extensively used. Among the preparations used as improvers are Porit and Multaglut, which contain ammonium persulphate. In the milling process only a few workmen actually come in contact with the flour; thus in a mill employing 120 men only thirteen had actually to do with the flour, eight of whom were engaged in tying up the full sacks. Dr. Teleky has made a strict inspection of several large mills and found in those in which improvers were used that there were always a few cases of eczema. In bakeries fitted with modern machinery, especially dough mixing machines, only a few of those employed come in contact with the flour.

An article on "Bakers' Itch," by Dr. A. C. Parsons, published in THIS JOURNAL in 1924 (vol. 5, p. 410) is extensively quoted. It was felt at that time that as it occurred most commonly in large centers of population, it was associated with bad working conditions, and that the sugar and salt may have been causes. Much has been done since then to improve working conditions of bakers in Germany, and night work has been prohibited and an eight-hour working day fixed by law. These improvements led to a marked reduction in skin diseases among bakers, but

about 1927 there was in most districts of Germany a large increase in the number of cases of bakers' eczema, and this corresponded to the beginning of the use of bleached and improved flour.

Dr. Zitzke has carried out a number of skin tests on bakers suffering from eczema to see whether they were sensitive to pure flour, bleached and improved flour, and materials used for bleaching and improving. During the last few years ninety patients with bakers' eczema have come for treatment at a clinic with which Dr. Zitzke is connected: as many as thirty in 1930 and a smaller number in each of the preceding years. With pure flour, half of the patients reacted; with improved flour, two-thirds reacted. The severest reactions were obtained when ammonium persulphate was used as an improver, even in the smallest proportions. The most important point in the prevention of bakers' eczema is the discontinuance of ammonium persulphate as an improver; and this should be enforced by law. The next important preventive measure is systematic skin testing of bakers with pure flour and providing a change of work for those found sensitive. The author has treated some cases by desensitization, using an extract prepared from rye flour and improved wheaten flour; this is injected into the skin of the back at periods varying from two to sixteen days, and causes a small area of urticaria at the site of the injection. Notes are given of the successful treatment of two patients by this method, one of whom was able to resume kneading in ten weeks and the other in sixteen weeks. Chronic or recurring bakers' eczema should be compensated as an occupational disease.—A. J. C.

DERMATITIS FROM CINNAMON. *L. Tulipan. Arch. Dermat. and Syph., May, 1932, vol. 25, pp. 921-923.*

The author reports a case of dermatitis in a white man, aged 33, who had been a baker for nineteen years and had had an eruption on his hands only once before, which had healed spontaneously after three weeks. His duties consisted in preparing the dough and icing for pies and cakes, and in their final baking. He presented a pinhead-sized vesicular eruption on erythematous bases with fissuring and crusting. Both palms from the finger tips to the wrists were involved. The ingredients used in preparation of the dough and icing were flour, baking powder, cream of tartar, and cinnamon sugar. Patch tests showed a positive reaction only to cinnamon sugar.

The literature contains no reference to dermatitis due to cinnamon, but Prosser White reports the case of a girl who developed erythema and vesiculation on the hands, abdomen, and face from the use of oil of cassia as a substitute for oil of cinnamon. The author feels justified in calling the present case a dermatitis due to cinnamon for the following reasons: Microscopically and culturally, and also by a trichophytin test, fungus was proved to be absent; patch tests with all ingredients used in baking gave negative results except with cinnamon; repeated tests with cinnamon gave positive results.—M. C. S.

EXPERIMENTAL NICKEL DERMATITIS. *W. Milbradt. Abstr. as follows from Dermat. Ztschr., Jan., 1932, vol. 63, p. 47, in Arch. Dermat. and Syph., June, 1932, vol. 25, pp. 1107–1108.*

Repeated painting of the ears of

white mice with 20 per cent. nickel sulphate solution resulted in a typical dermatitis in 90 per cent. of the animals in between three and five weeks. The use of a 1 per cent. solution gave no results. After painting with the 20 per cent. solution for long periods, from two to four months, a specific desensitization occurred. The inflammatory reaction was a local allergic manifestation, no evidence of a general allergy developing.

PREVENTION OF OIL RASHES. *H. M. Stationery Office, Form 296, Feb., 1932.*

Blackheads, pimples and pustules, and other rashes, are very liable to occur on parts of the body contaminated by oils, particularly after slight injuries to the skin, such as may be caused by metal filings.

Inquiry has shown that the organisms or germs usually responsible for the severer forms of rashes are normally found in great numbers on the surface of the skin, and that the introduction of antiseptics into the oil, or other means taken to render the oil sterile, cannot be relied upon to prevent the trouble. The essential features of this form of dermatitis are (1) blocking and irritation of the mouths of the follicles of the skin, followed by (2) septic infection by germs generally derived from the skin surface.

In order to avoid these rashes, it is absolutely necessary that the skin should be very thoroughly cleansed before and after work. Ordinary washing with soap and water does not accomplish this effectively, and the adoption of the following routine is advocated.

Before Work.—The operative should wash the hands and arms with soap and water to remove surface germs, and if he has any sore or injury he should obtain first aid treatment for it. Any protective clothing (aprons, etc.) provided should be carefully adjusted.

After Work.—1. The hands and arms should be washed in a lotion having the following composition:[1]

Chlorinated lime (powdered)	175 grains
Bicarbonate of soda	350 grains
Boric acid	35 grains
Water	30 ounces

Before use, mix with ten times the quantity of water.

2. After the use of this lotion the skin should be *rinsed well* with soap and water. The lotion is slightly antiseptic but first aid treatment is nevertheless desirable for any injury that can be detected.

PROFESSIONAL ULCERATION OF THE BALLS OF THE FINGERS AND THE THENAR EMINENCE OF THE HAND. *Milian. Paris méd., Jan. 16, 1932, vol. 1, p. 68.*

[1] Dakin's solution may be substituted if desired.

OCCURRENCE AND PREVENTION OF INDUSTRIAL ACCIDENTS

INTERNATIONAL CONFERENCE ON SAFETY IN MINES AT BUXTON, 1931. *Safety in Mines Res. Board, Paper No. 74. H. M. Stationery Office, 1932, pp. 67.*

Some account is given of the proceedings of the International Conference on Safety in Mines, which was held at Buxton in 1931, and was attended by representatives from Bel-

gium, France, Germany, and America. It contains papers communicated to the conference on "Simultaneous Shot-Firing: the Position in Belgium," by A. Breyre of Belgium; "Testing of Explosives," by M. Audibert of France; "Investigations on the Igniting Power of Explosives," by E. Beyling of Germany; and "The Application of Schlieren Photography in Researches on Explosives," by W. Payman of England. The report is well illustrated. The conference is an excellent instance of international co-operation between research stations concerned with health and safety in coal mines. An important resulting feature is that periodic meetings of the directors of research will be arranged at each research station in rotation.—E. L. C.

INDUSTRIAL SURGERY

TRAUMATIC INDUSTRIAL SURGERY. *E. T. Trice. Virginia Med. Monthly, March, 1932, vol. 58, p. 808.*

TREATMENT OF BURNS WITH DRY HOT AIR. *P. K. Karpov. Abstr. as follows from Sovet. Vest. Dermat., Sept.–Oct., 1931, vol. 9, p. 605, in Arch. Dermat. and Syph., June, 1932, vol. 25, p. 1111.*

The author for experimental purposes produced burns on his skin and on that of a nurse, and used dry hot air in treatment. His observations brought the following conclusions: Dry hot air applied to a burn diminishes the amount of exudation. When this treatment was applied immediately to burns that were produced by temperatures causing burns of second to third degree (according to Behrend, second degree burns are produced with from 75 to 100 degrees of temperature), the formation of bullae was not prevented, but their size and number were limited, and pain was lessened. Further treatment with heat brought about quick healing even when no other kind of treatment was used. Burns produced by lower temperatures, which cause burns of second to first degree, could be aborted by one application of dry warm air; no blisters formed and no further treatment was necessary. First degree burns were, of course, favorably influenced in regard to pain and rapid healing.

INDUSTRIAL PHYSIOLOGY: NUTRITION, METABOLISM, FATIGUE, ETC.

RESUSCITATION. *A. H. Miller. Abstr. as follows from Rhode Island Med. Jour., March, 1932, vol. 15, p. 39, in Jour. Am. Med. Assn., May 21, 1932, vol. 98, p. 1842.*

Miller states that resuscitation is possibly effective thirty minutes after the heart has ceased to beat. It should be persisted in for another thirty minutes before one loses courage. Infants have been resuscitated and have recovered when there had been no voluntary respiratory movements for two and a half hours. As long as the circulation is maintained, there is hope. When there is need for resuscitation, time must not be wasted in moving the patient or waiting for the arrival of an

inhalator. Artificial respiration by one of the manual methods should be instituted as soon as possible and continued while the inhalator is on the way. When the inhalator arrives, it should be used even if respiration has been established by manual methods. In cases treated with carbon dioxide and oxygen, pneumonia does not develop, which was the regular sequence of carbon monoxide poisoning before the introduction of the inhalator. When artificial respiration must be performed for a long period, as in the paralysis of anterior poliomyelitis or in poisoning from morphine or alcohol, the Drinker respirator is invaluable. It produces efficient artificial respiration over periods of days or weeks without strain on the operator or damage to the patient.—C. K. D.

STUDIES IN REVIVIFICATION: I. ORGANIZATION OF RESUSCITATION MEASURES. *J. O. Wanger and S. N. Blackberg. Am. Jour. Med. Sc., Feb., 1932, vol. 183, p. 241.*

THE INFLUENCE OF MUSCULAR WORK ON PROTEIN METABOLISM. *H. E. C. Wilson. Jour. Physiol., May 30, 1932, vol. 75, pp. 67–80.*

Under certain conditions muscular work causes an increase, followed by a decrease, in the excretion of nitrogen and sulphur in the urine. The increase in the secretion of nitrogen and sulphur has no relation to the amount of work done. The quality of the protein ingested appears to be one of the factors which influences the amount and the sulphur:nitrogen ratio of those elements excreted above the basal value. The evidence tends to show that the rise in the excretion of nitrogen and sulphur is not caused by an increase in the endogenous metabolism, but is due possibly to an acceleration in the metabolism of food protein. The results are interpreted as showing that muscle work causes an increase in the katabolism of protein which is later followed by a compensatory anabolic phase. The material retained in the anabolic phase tends to approximate in its composition to body tissue as judged by its sulphur:nitrogen ratio. —T. B.

METABOLISM DURING WORK. *E. Simonson. Klin. Wchnschr., 1931, vol. 10, pp. 1937–1941; pp. 1977–1981.*

FURTHER INVESTIGATION OF SWEATING AND SWEAT. *A. G. R. Whitehouse. Proc. Roy. Soc. London, Series B., 1931, vol. 108, p. 326.*

This paper deals with a continuation of the work described in a previous paper (see Hancock, Whitehouse, and Haldane, THIS JOUR., 1930, vol. 12, Abstr. Section, p. 206). The subject was a miner who was more or less acclimatized to working in a hot place.

For a given rise in body temperature, sweating is facilitated by the performance of muscular work. It is suggested that the extra stimulus to sweat production is due to some product of muscular metabolism.

But little rise in the chloride concentration of the sweat appears to accompany the performance of a moderate amount of work, while a marked increase with time appears when the subject is at rest and the sweating is simply due to the wet bulb temperature. There is a progressive decrease in the proportion of organic matter to ash as sweating continues. A small

amount of sulphate was found in the sweat during the first period of an experiment, but only traces were found in the later stages.

The sweat of this subject showed a lower chlorine concentration and a much higher percentage of chlorine as potassium chloride than was found with the subjects of earlier experiments.

When the subject was at rest in air saturated at 95°F., there was little disturbance of the regulation of body temperature. Moderate work could be done with a wet kata cooling power of about 3, and a wet bulb temperature of 90°F. It is said that these values appear to depend to some extent on the acclimatization of the subject, as well as on the walls of the chamber being slightly cooler than the air.—T. B.

Hour Laws for Women in New York State Compared with Those of Other States. *Abstr. as follows from N. Y. State Dept. Labor, Indust. Bull., Nov., 1931, vol. 11, pp. 39, 58, in Personnel Jour., April, 1932, vol. 10, p. 434.*

"In comparison with the hours laws for women in other states those of New York approximate the best standards set up regarding the length of the working day and week, and the enforcement of these laws. New York State has failed however to extend her hour laws to include protection for clerical, hotel, and beauty parlor workers." Ten states, including New York, limit the working day to eight hours and, with the exception of Colorado, the working week to forty-eight hours.

Six-Hour Day—A Year's Operation; an Interview. *W. K. Kellogg. Abstr. as follows from Indust. Relations, Nov., 1931, vol. 2, pp. 373–375, in Personnel Jour., April, 1932, vol. 10, p. 434.*

This article reviews the successful shorter day plan which has proved of great benefit to employees. After eighteen hours of leisure the workers return refreshed, well able to work their six-hour shift. All meal periods have been eliminated and the cafeteria "scrapped." The author outlines also the bonus, pension, co-operating aid society, insurance, and recreation policies of the Kellogg Company.

ABSTRACT OF THE LITERATURE OF INDUSTRIAL HYGIENE

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SYSTEMIC OCCUPATIONAL DISEASES: OCCURRENCE, TREATMENT, AND PREVENTION

ON THE PATHOGENESIS OF OCCUPATIONAL DISEASES AMONG WORKERS IN THE PORCELAIN INDUSTRY. *W. Latischev. Gigeina, bezopasnosti i patologia truda, 1931, no. 3, pp. 31–35. (Translation of German Summary, p. 35.)*

The course of pulmonary tuberculosis among those engaged in dusty trades more often assumes a stable character and ultimately an indurative form. In workers in hot trades fibrous pneumonia, as well as various trophic disorders, is observed; in glass blowers pulmonary emphysema occurs frequently, causing a shifting of the hydrogen ion concentration to the acid side.

The increased irritability of the nervous and muscular systems which was demonstrated in the workers studied, can be ascribed to the decalcification of the organism, resulting from the increased elimination of calcium salt in pulmonary tuberculosis. In many cases heart disease is observed in addition to simultaneous sclerotic changes in the blood vessels. As to the stomach and intestinal canal, lowered acid content in the gastric juice and gastroptosis are observed, obviously owing to the diminished tonicity of the digestive apparatus.

Among the women, curvatures were often noted, as well as abnormal positions of the uterus, which can be ex-

plained through the impaired tonus of the smooth musculature resulting from nutritional disorders.

In several trades symptoms of chronic lead poisoning were observed in many workmen.—A. M.

REMARKS CONCERNING THE INCREASE OF CANCER OF THE LUNG. *M. Lipschitz. Abstr. as follows from Ztschr. f. Krebsforsch., 1931, vol. 34, p. 376, in Am. Jour. Cancer, May, 1932, vol. 16, p. 606.*

Judging from the reported autopsy findings there can be little doubt, according to the author, that cancer of the lung is increasing. The cause of this is not at all clear. Inhalation of tar fumes from the street and exhaust products from automobiles have been accused. If the latter were the cause, the incidence of cancer of the lung should be greater in cities with large automobile traffic. Statistics do not bear this out. Lately a high incidence of cancer of the lung has been reported in the workers of the Joachimstal district in Czechoslovakia. This has been attributed to radioactive substances present in the mines. It would suggest that occupation and place of dwelling have a direct relationship to the incidence of carcinoma of the lung.

IS CHIMNEY SWEEPS' CANCER REALLY EXTINCT? *Dütschke. Abstr. as follows from Ztschr. f. Krebsforsch., 1931, vol. 34, p. 159, in Am. Jour. Cancer, May, 1932, vol. 16, p. 556.*

The author attempts to refute the contention of Richter (see THIS JOUR., 1931, vol. 13, Abstr. Section, p. 111) that chimney sweeps' cancer is a thing of the past, by reporting a case which he observed in 1930. The patient was a chimney sweep, 69 years of age, and showed an ulcerated squamous cell epithelioma on the scrotum. The author believes that a direct relationship existed between the patient's occupation and the development of the cancer.

PULMONARY ANTHRACOSIS, CARDIAC INSUFFICIENCY, INCOMPLETE ADDISON'S DISEASE. *P. Sisto. Minerva Med. Jan. 14, 1932, vol. 1, p. 62.*

RHEUMATISM IN THE LONDON BUSMEN. *S. J. G. Nairn. Brit. Jour. Physical Med., Jan., 1932, vol. 6, pp. 214–215.*

This article appears in a series, all of which are devoted to different aspects of rheumatism. It gives some detail concerning 323 cases treated between July and October, 1931, after a clinic for the physical treatment of rheumatism had been equipped by the London General Omnibus Company. The cases of rheumatism included 183 which were nonarticular, and 121 which were articular. An interesting point comes out with regard to articular rheumatism of the shoulder joint; the great majority of the cases were bus drivers, and the etiologic traumatic element was gear changing, which, in buses, is invariably stiff and calls for effort, and possibly jarring. Those who had osteoarthritis of the right shoulder were drivers of the old type of bus, with a right-hand gear change; while those who suffered in the left shoulder joint were mostly drivers of the new type of bus, with the left-hand gear change. Except for this interesting detail, the length of time that the clinic has been opened has not afforded opportunity for close study of the cases seen.—E. L. C.

DUPUYTREN'S CONTRACTION AND OCCUPATION. *W. Niederland. Arch. f. Gewerbepath. u. Gewerbehyg., 1932, vol. 3.*

The author here gives the results of observations made on Dupuytren's contraction in three groups of workers, all over 40 years of age. Group 1 included 135 men engaged on heavy repetitive work, *i.e.*, lifting heavy weights by a ring handle; group 2 included 342 men engaged in moderately heavy work, such as book printers and lithographers; and group 3 included 112 men not using the hands for heavy work, such as officials. In group 1 there were nine severe cases of Dupuytren's contraction and seventeen slight cases; in group 2 two severe cases and twenty-four slight cases; and in group 3 no severe cases and three slight cases.

It is interesting to note the history of the three slight cases in group 3. One was a high government official who was an enthusiastic geologist, and on his expeditions used to hold stones on the palm of the left hand while he broke them with a hammer; another, a doctor, had served in an infantry regiment; and the third, a doctor, on his daily walk carried a walking stick with a knobby top. Particulars are also given of a group of thirty-five men, aged from 30 to 60 years, employed in dye works stretching dyed hanks of yarn. Among these, six early cases were found. Veterinary surgeons have described a similar condition in the forefeet of horses from trotting and galloping on hard ground when carrying heavy weights.

Dupuytren's contraction is to be regarded as a local disease *sui generis* and not associated with other diseases, such as rheumatism, gout, alcoholism, or lead poisoning. In rare cases a single injury may cause the condition and on the other hand isolated cases may occur without obvious traumatic causes, but with strong hereditary influence. In the overwhelming number of cases the condition is a sequel of prolonged repeated trauma of the hand surface and is a genuine occupational disease.—A. J. C.

POISONOUS HAZARDS AND THEIR EFFECTS: GASES, CHEMICALS, ETC.

OCCUPATIONAL CANCER IN ANILINE DYE WORKERS AS OBSERVED IN THE SURGICAL CLINIC OF HEIDELBERG UNIVERSITY. *W. Büttner. Abstr. as follows from Ztschr. f. Krebsforsch., 1931, vol. 34, p. 605, in Am. Jour. Cancer, May, 1932, vol. 16, p. 554.*

This is a study of tumors of the urinary bladder occurring among the men (from 38 to 54 years old) of an aniline dye factory over a period of about twenty years. Those working with both fuchsin and aniline were involved. The average time elapsing between first exposure and earliest symptoms was twenty-three and nine-tenths years. As for length of employment, two classes of cases are recognized: one comprises the men who remained uninterruptedly at the works until the appearance of the first symptoms, a period of from twenty to twenty-five years; the other includes those who left after from fourteen months' to five years' employment, and who developed a tumor from twenty to twenty-four

years later. The author thus confirms the statement of other investigators, that a tumor of the bladder may arise years after exposure has ceased.

The removal of fumes by an improved ventilating apparatus resulted in a diminution of the number of cases.

Two of the growths were papillomas and seven were carcinomas.

CHRONIC (CUMULATIVE) CARBON MONOXIDE POISONING. *a. D. v. Dassell. Abstr. as follows from Gasmaske, Feb., 1932, vol. 4, pp. 5-9, in Chem. Abstr., May 20, 1932, vol. 26, p. 2801.*

Seven persons working in a room together were exposed for from eight to nine hours per day over a period of several months to very low concentrations of carbon monoxide. All showed the same chronic symptoms of fatigue, headache, difficulty in breathing, indigestion, pain in the heart, nervous affections, etc. All recovered after a long period in a sanatorium with strict diet regulation. An investigation indicated that if the product of the time of continuous respiration in hours per day by the concentration in terms of volume of carbon monoxide per 10,000 volumes of air is not greater than 3, no physiologic effect results. When this product is as large as 6, definite effects result.—P. D.

RELATIVE TOXICITY OF SOME FLUORINE AND ARSENICAL INSECTICIDES. *H. F. Smyth and H. F. Smyth, Jr. Abstr. as follows from Indust. and Engin. Chem., Feb., 1932, vol. 24, pp. 229-232, in Chem. Abstr., April 20, 1932, vol. 26. p. 2270.*

The relative toxicity of fluorine and arsenical insecticides was determined by feeding to white rats various accurately measured amounts of cryolite, barium fluosilicate, and lead arsenate mixed with their food for sixteen weeks. The results, including behavior, appetite, fecundity, growth, tooth development, and organ pathology agree in indicating the arsenic compounds used to be several times as toxic as the fluorine compounds. The use of fluorine insecticides leaves a much wider margin of safety than do arsenic materials between the weight of spray residue on fruit and the amount toxic to the customer.—P. D.

STUDIES ON THE EFFECTS OF INDUSTRIAL POISONS ON THE PRODUCTION OF ANTIBODIES. I. LEAD. *F. W. Bickert. Arch. f. Hyg., 1931, vol. 106, pp. 271-298.*

The author records a series of experiments—considerable in their total number, but including relatively few animals in each experimental group—from which he draws the following conclusions:

(1) The administration of lead acetate to rabbits by mouth increases the production of hemolysin. (2) The subcutaneous injection of lead sugar has a similar effect. (3) Hunger, of a degree to reduce weight to the same extent as in the lead treated animals, has no significant effect on hemolysin production. (4) Metallic lead and lead carbonate have a similar action to lead acetate. (5) Lead acetate has a similar stimulating action on the production of agglutinins. (6) Lead acetate has an inhibitory effect on the production of precipitins. (7) Lead acetate has a stimulating effect on the production of diphtheria antitoxin.

RADIUM POISONING. *J. P. Leake. Jour. Am. Med. Assn., March 26, 1932, vol. 98, pp. 1077-1079.*

This is a brief summary of the investigation of the United States Public Health Service into the question of the hazards of luminous dial painting. The results will be published in extenso in the *Public Health Reports*.—L. T. F.

HYGIENIC CONDITIONS OF WORK IN CERTAIN OPERATIONS OF SPRAY PAINTING, WITH THE USE OF CELLULOSE VARNISHES. *F. H. de Balsac and A. Feil. Mouvement Sanitaire, 1932, vol. 9, pp. 222-226, 229.*

Some description is given of the use of the spray to apply cellulose varnishes in France. These varnishes contain from 75 to 85 per cent. fluids, and from 15 to 25 per cent. solids. The solids contain nitrocellulose resins and gums, together with pigments, among which lead salts may figure; but the amount of lead seldom reaches 2 per cent. of the whole. Any risk arises from evaporation of solvents. Examination of men employed at a factory near Paris showed that there was some complaint of gastric troubles, of cough and difficulty in breathing, of vertigo and giddiness, as well as headache. Examination, however, failed to disclose any pathologic condition, while blood showed no abnormality, nor could signs of lead absorption be detected. Apparently the use of the spray for painting presents little risk under good conditions of ventilation. Any symptoms present disappear quickly in the open air. Nevertheless, if different materials be used, such as chlorine bodies, poisoning might result. Moreover, none of those examined had worked for more than a few years; possibly longer exposure may prove the work to be harmful.—E. L. C.

DUST HAZARDS AND THEIR EFFECTS

PULMONARY ASBESTOSIS. *J. V. Sparks. Radiology, Dec., 1931, vol. 17, pp. 1249–1257.*

THE ASBESTOSIS BODY. *S. R. Gloyne. Lancet, June 25, 1932, vol. 1, pp. 1351–1356.*

In this article the author brings together all the information he can collect with regard to the first recognition of what are now known as asbestosis bodies, and concerning their origin, both theoretically and experimentally considered. He has himself contributed much to the whole subject. A series of drawings presents various forms of asbestosis bodies; while information is given as to how these bodies react to acids and alkalies, as well as to ferments. The conclusion seems definite that they are formed by the deposit upon fine asbestos fibrils of organic matter from the tissues, which contains iron. This organic coating can be dissolved, leaving bare the original fine fibril. This article brings up to date in a useful way the considerations relative to the asbestosis body, but curiously omits any reference to the presence of such bodies in lungs not exposed to asbestos dust, such as coal dust, as reported by W. E. Cooke (see following abstract).—E. L. C.

SILICO-ANTHRACOSIS PRESENTING CURIOUS BODIES SIMILAR TO THOSE IN ASBESTOSIS. *W. E. Cooke. Brit. Med. Jour., April 9, 1932, vol. 1, pp. 656-657.*

The primary factor in the production

of coal miners' lung is silicosis, coal dust being retained in large amounts when the lymph drainage has been impaired by the action of silica; thus anthracosis is a special variety of silicosis, depending upon the accumulation of coal dust in a silica damaged lung. Most of the cases have been described among men getting anthracite coal, but the author cites a case in a miner who had worked on soft coal. Chemical analysis of the lung showed a silica figure of 40.2 per cent. in the ash, of which 15.6 was insoluble silica. An interesting point is that certain bodies similar in every way to the curious bodies seen in cases of asbestosis were found in the lungs. Apparently such bodies are not peculiar to asbestosis, and any spicule of insoluble material may have colloid deposited around it and become molded into a curious body. The appearance of such bodies is illustrated.—E. L. C.

SILICOSIS. *Lancet, June 4, 1932, vol. 1, p. 1206.*

A useful summary is here given of the experimental investigations which have been carried out into the development of pulmonary fibrosis following dust inhalation. Tests have shown that there are two groups of dusts, one active and the other inert. The inactive dusts include carbon, coal, aluminium oxide, oxide of iron, marble, and carborundum; the active dusts in all cases contain silica in some form, as either quartz, shale, kaolin, or asbestos. Particular attention is drawn to the procedures followed by Professor Kettle, who studies the effects of dust by either subcutaneous experimental lesions or by intratracheal injection into the lungs.—E. L. C.

SILICOSIS AND THE INDUSTRIALIST. *H. Ballantyne. Jour. State Med., June, 1932, vol. 40, pp. 342–349.*

The causation of silicosis as envisaged by an industrial managing director is set out. No threshold beyond which dustiness in the air becomes a hazard has been fixed medically, although some undefined degree of dustiness is acceptedly quite harmless. Today large industrial concerns must be prepared to install means for trapping or withdrawing from the working atmosphere as much dust as is practicable. It is safest to err on the side of excess when safeguarding the health of workers.—E. L. C.

CLIMATE

ATMOSPHERIC POLLUTION IN BORDEAUX. *P. Lamarque. Gaz. hebd. d. sc. méd. de Bordeaux, 1932, vol. 53, pp. 210–219.*

An investigation extending over a period of eighteen months was carried out by the author into atmospheric pollution of the town of Bordeaux. Various reasons contribute to this pollution, such as the manufacture of sulphuric acid and hyperphosphates, the combustion of organic waste, domestic fires, the exhaust fumes from the combustion of heavy oils and from motor cars; while nitrous fumes and fluosilicic acid emanate from certain industries. The author considers that all forms of pollution can be prevented, frequently with an advantage from the capture of valuable material now allowed to waste. The way in which such steps should be taken is outlined; and the

suggestion is put forward that inspectors should be appointed to insure that the regulations laid down are strictly observed. The only form of pollution admitted is that coming from wood fires, which are still used by bakers and confectioners. A definite standard for the amount of permitted dust in suspension is proposed. It adopts Ringelmann's scale, which is much used in America.—E. L. C.

OBSERVATIONS IN BASEL WITH THE DAVOS FRIGORIMETER. *M. Bider. Strahlentherapie, 1931, vol. 39, pp. 541–564.*

In the first part of the paper the meteorologic factors influencing the cooling rate of the frigorimeter are analyzed.

The relation between rate of cooling, temperature, and air velocity is given as

$$\frac{A}{\theta} = 0.31 + 0.112v$$

where A is the rate of heat loss; θ is the temperature difference between frigorimeter (36.5°C.)and the surrounding air; and v is the air velocity in meters per second. Dorno found that A varied as $v^{1.5}$, while Hill's kata-thermometer equation shows that the cooling power as measured by that instrument varies as the square of the velocity.

The air velocity formula was calculated from the records for rainless nights. From the difference between the observed cooling rate and that calculated from the equation one finds the influence of rain and radiation. The percentage of the cooling rate due to rain is highest in the summer months. The influence of radiation is naturally much greater in summer than in winter.

In the second part of the paper the data are discussed from a climatologic standpoint.—T. B.

AIR POLLUTION—AND A POSITIVE CURE FOR THE SMOKE NUISANCE. *H. W. Evans. Aerologist, April, 1932, vol. 8, pp. 15–18.*

INDUSTRIAL ENVIRONMENTAL CONDITIONS

THE NEW KATA-THERMOMETER. *T. C. Angus. Engin., March 4, 1932, vol. 133, p. 281.*

A new kata-thermometer has been constructed, in which the cooling range is from 130°F. to 125°F. instead of from 100° to 95°. Otherwise the instrument is as before; but it cools more quickly than the original kata under given conditions. The cooling power so measured should not be used directly in connection with our scale of comfort; it is rather a link in the determination of air velocities for which the new instrument was designed. A nomograph is reproduced for use in industrial ventilating problems.—E. L. C.

AN AIR THERMOSTAT FOR QUANTITATIVE LABORATORY WORK. *W. H. J. Vernon. Tr. Faraday Soc., June, 1931, vol. 27, pp. 241–247.*

Details are given of an air thermostat designed with the object of maintaining accurate control of temperature over comparatively long periods. Readings on a Beckmann thermometer placed in different positions over the whole working space of the thermostat

(the working floor of which measures 79 inches by 30 inches) showed a maximum "spatial variation" of 0.015° at a controlled temperature of 25°C. Variations in point of time did not exceed 0.005° (observations extended over working period of two weeks, with thermometer in fixed position in thermostat; outside temperature varied between 15.5 and 22.5°). A temporary disturbance caused by opening a door of the thermostat to its fullest extent for three or four minutes, resulting in the temperature falling by 0.03°, was completely eliminated in twenty seconds.—*Author's Summary.*

THE ANEROID BAROMETER AS AN AID TO IMPROVEMENT OF ATMOSPHERIC CONDITIONS IN DEEP WORKINGS (SEVENTEENTH REPORT TO THE COMMITTEE ON "THE CONTROL OF ATMOSPHERIC CONDITIONS IN HOT AND DEEP MINES"). *B. R. Lawton. Tr. Inst. Min. Eng., 1932, vol. 83, p. 79.*

In the abstracts of THIS JOURNAL reference has previously been made to papers dealing with the subject of air pressure surveying in mines. The present paper forms a further contribution to the subject.

Attention is drawn to the serious errors due to "creep" which may occur even with a high grade aneroid. In surveying along level or slightly inclined airways, corrections were unnecessary, but in shafts or steeply inclined workings, where the instruments are subjected to a fairly large pressure range, the incidence of calibration errors and "creep" make the use of a correction chart imperative. If the aneroid has been subjected to a large variation in pressure it may be several hours before the instrument again reads accurately. An instance is recorded in which forty-eight hours elapsed before the traverse instrument agreed with the check instrument at the base station.

The value of air pressure surveying as an aid to the improvement of comfort conditions is emphasized. By its means loss of ventilation through leakage or excessive road resistance is readily discovered.—T. B.

PLANT POLLEN—A PROBLEM IN AIR CONDITIONING. *O. C. Durham. Aerologist, April, 1932, vol. 8, pp. 5–7.*

HEAT TRANSMISSION AS INFLUENCED BY HEAT CAPACITY AND SOLAR RADIATION. *F. C. Houghten, J. L. Blackshaw, E. M. Pugh, and P. McDermott. Heating, Piping, and Air Conditioning, Jour. Sec. of Am. Soc. Heating and Ventil. Eng., April, 1932, vol. 4, pp. 288–310.*

In recent work at the Research Laboratory of the American Society of Heating and Ventilating Engineers at the Pittsburgh Station of the United States Bureau of Mines, it was found that an error may be introduced into heat transmission calculations by neglecting the effect of the sun in its diurnal movement. The work and a resulting series of characteristics of heat flow through eight roof panels is described in the article.

The study was carried out using a box with the material in question as the roof and with provision to maintain conditions within the box at a constant desirable temperature and humidity. Thermocouples were located in the outer and inner surfaces of the panels so that the temperature gradients and other temperature rela-

tions could be studied. Studies were made of the following subjects as affected by the thickness, conductivity, and heat capacity of the different panels: (1) cyclic heat flow through the inner surfaces of the panels; (2) maximum and minimum rate of penetrations during twenty-four-hour periods; (3) timing and intensity of temperature waves at outer and inner surfaces; (4) rate of heat flow into an air conditioned space.

A theoretical mathematical analysis of the cyclic flow of heat under the foregoing conditions resulted in the presentation of formulas for the rate of heat flow into an air conditioned space for any hour of the day as a function of a Fourier series analysis of the outside surface temperature, the air conditioned temperature, and the thickness and the physical properties of the structure. An empirical method of determining certain constants in these theoretical formulas is developed. This simplified method gives the heat flow into an air conditioned space with a fair degree of accuracy, in terms of the maximum and minimum outside surface temperatures for the day, the inside air conditioned temperature, and the thickness and physical properties of the structure. In the curves plotted, it may be seen that the calculated heat flow and temperature agree quite closely with that found by experiment.

In this work it soon became quite apparent that conductivities as given in the Guide issued by the Society required checking. This paper included data on the conductivities, densities, and specific heats of the materials contained in the different roof panels and the methods developed for obtaining them. A recording pyrheliometer, developed at the Society Laboratory for measuring solar radiations, is described, and data are presented for the first days of July, August, and September, on the intensity of solar radiations impingement upon a horizontal surface, and upon east, south, and west walls.

The data collected and analyzed are for horizontal surfaces of homogeneous compositions only. Since the primary data considered the outside surface temperature, the methods of calculation presented will apply equally well to homogeneous structures in any position as long as the analysis is made of outside surface temperatures. Continued and more complicated work is needed for new homogeneous structures. Also, windows were not included in this work, and would obviously introduce another complication.—A. D. B.

COAL-FACE LIGHTING BY MEANS OF MAGNETIC INDUCTION. *W. Cramp. Tr. Inst. Min. Eng., 1932, vol. 83, p. 1.*

In this paper Professor Cramp makes a notable contribution to the subject of mine lighting.

For safety in the mine, any mains lighting system should fulfil the following desiderata:

1. Accidental damage to one lamp should not affect others.
2. The replacement of a lamp should be impossible unless its circuit is harmless; but it should be possible to carry out such a replacement without interfering with other lamps and without relying on automatic devices.
3. The voltage per lamp should be at all times so low as to render an explosion from a broken lamp impossible.
4. No live terminals should ever be exposed.

5. Plugs and sockets which can be parted while alive should be avoided.

6. Switches should be reduced to a minimum.

7. Adequate earthing should be possible of all exposed metal fittings fed from the power mains.

In principle, only three systems of mains lighting have been proposed hitherto, *viz.*:

1. Two or more lamps in series between power phase wires.

2. Lamps (*a*) in series, or (*b*) in parallel between phase wire and neutral.

3. Lamps fed through a special lighting transformer supplied from the power mains.

None of these methods fulfils all the desiderata, and it is suggested that use should be made of the principle of lighting by local induction—*i.e.*, to have no electrical connection whatever between the lamps and the supply mains. Each lamp is connected permanently to the secondary of a small transformer whose primary is fed from the mains. When the lamp is to be used, its secondary is rendered active by being placed close to its primary coil, so that it is magnetically coupled to it. When the lamp is to be extinguished it is simply removed from the neighborhood of its primary. No switch is needed and no circuit is broken. A single circuit is arranged with a transformer primary for each lamp, all the primaries being in series.

A demonstration apparatus was arranged with 100-watt lamps, and the following results show the characteristics of the system:

1. When no lamp is in position, the primary current is 11.25 amperes on normal full voltage.

2. When all lamps are in position and lighted, the current falls only 2.2 per cent. at the same voltage.

3. With one-third of the lamps removed, the current increases only 1.3 per cent.; with the same proportion short-circuited, the current does not rise beyond 13.7 amperes; and with one-third of the lamps burned out, the current falls only 7.5 per cent.

It is said to be unlikely that such severe conditions as are detailed in these tests would arise in practice.

Reference is made to the method of installation to meet the convenience of removal and to obviate accidents.

The paper, together with the account of the subsequent discussion, merits the close attention of all concerned with the question of mine illumination. —T. B.

A Photometer for Use in Mines. *J. I. Graham. Tr. Inst. Min. Eng., 1932, vol. 83, p. 68.*

The influence exerted by poor illumination in causing miners' nystagmus gives interest to photometer readings underground. A new photometer suitable for use in mines is described. It is based on the principle of the variation in brightness of a series of holes situated at increasing distances from a source of light. In order that the instrument may be used in gassy pits, the source of illumination is an electric cap-lamp. The complete apparatus comprises:

a. An ordinary cap-lamp battery, in case with twin cable leading into b.

b. Aluminium box containing (1) voltmeter (which can be read to 0.005 volt), with illuminated scale; (2) sensitive variable resistance; (3) switch for the small voltmeter lamp. The twin cable extends from this box to the cap-lamp.

c. Cap-lamp, fitted with holder for photometer head.

d. Photometer head, composed of aluminium adapter which fits on the cap-lamp

cover and also holds a blue, ground glass light filter which virtually acts as the source of illumination.

e. An aluminium tube fitting into d, 1½ inches external diameter with a planed face to give a flat surface approximately ¾ inch wide. In this planed face holes are drilled at ⅜ or ¼ inch apart. The tube is lined with white mat paper.

The apparatus is easy to use, and readings are taken very quickly. The range of error is about ± 10 per cent., and this degree of accuracy is sufficient for practical mining work.—T. B.

THE MODERN INSTITUTE. *A. F. Loewe. Tr. Illumin. Engin. Soc., May, 1932, vol. 27, pp. 459–486.*

The purpose of this paper is to suggest types of equipment and logical steps in the development of lighting demonstrations depending upon the real and continuous utilization of equipment in obtaining acceptance of the engineer's efforts.

The paper also gives valuable information to the teacher or student of illuminating engineering. The illustrations and diagrams for demonstrations are excellent.—P. D.

THE DISTRIBUTION OF ULTRA-VIOLET RADIATION IN A ROOM. *H. E. Beckett. Abstr. as follows from Brit. Jour. Physical Med., 1931, vol. 6, pp. 146–148, in Bull. Hyg., Jan., 1932, vol. 7, pp. 66–67.*

The author has sought to determine what intensities of therapeutic ultraviolet radiation (*i.e.*, around 3,000 ångström units) are made available in a room glazed with the special ultraviolet transmitting glass. In the method used, a small model of a room is fitted with a sheet of sensitized photographic paper over which the distribution of radiation is to be determined, the model being placed outside when the sky is uniformly overcast. The photographic record shows this distribution over the plane in question, and from the degree of blackening there can be deduced the intensity of the ultraviolet part of the actinic radiation. The therapeutic intensity of skyshine was found to decrease very rapidly with increasing distance from a window, but the intensity of direct sunshine was found to be uniform over those parts of a room from which the sun is visible. Skyshine, though usually of small intensity within a room, can be received throughout the day, and even in rooms in which no direct sunshine penetrates.—R. G. B.

INDUSTRIAL MEDICAL SERVICE: MEDICAL DISPENSARIES AND HOSPITALS IN INDUSTRIAL PLANTS

RADIOLOGICAL EXAMINATION OF THE CHEST. *M. Weinbren. Proc. Transvaal Mine Medical Officers' Assn., 1931, vol. 11, no. 126, pp. 85–91.*

The author first stresses the technic of radiology, whether by fluoroscopy or by film. In making a film the following factors must be standardized: (*a*) milliamperage, (*b*) kilovoltage, (*c*) time of exposure, and (*d*) distance. Attention is directed particularly to the detection of fibroid tuberculosis. The presence or extent of adhesions can only be diagnosed by radiology; and only so can the suitability of cases for artificial pneumothorax be determined. The value of the paper is enhanced considerably by twenty-

four figures of X-ray films, which are discussed in the text. The author holds that a bad film is worse than useless, and, on the other hand, that a good film carelessly glanced at may also be of little value.—E. L. C.

Medical Examination of Young Workers in Poland. *W. Chodzko. Office internat. d'hyg. pub., Bull. mensuel, 1932, vol. 24, pp. 637–640.*

Poland, since it became a European state, has established medical examination of young persons entering industry, that is, of adolescents between ages 15 and 18. Certain doctors are recognized for the purpose. The first law was passed at the end of 1924 and it was strengthened in 1928. Some account is given of how the work is done in co-operation with the national health insurance. The medical work thus started is extending, since the doctors are being called upon to supervise other health matters at factories. During 1930, 22,127 young persons were examined, of whom 6,006 were examined for a second time. Among those examined for the first time, 0.6 per cent. were found incapable of work; most of these were of low social standing. Information is given regarding the diseases found present; adenoids stood first, with affections of the eye second, and pulmonary tuberculosis third. The opinion is expressed that the experience already gained has shown that these examinations are extremely useful.—E. L. C.

INDUSTRIAL PSYCHOLOGY AND INDUSTRIAL MANAGEMENT IN ITS HEALTH RELATIONS

Inspection Processes in Industry. (A Preliminary Report.) *S. Wyatt and J. N. Langdon. Indust. Health Res. Board, Rep. No. 63, pp. 53. H. M. Stationery Office, 1932.*

Workers are particularly selected for inspection processes, which represent a form of repetition work; but it is one in which attention cannot be allowed to stray. A number of workers employed at the following inspection processes were subjected to tests: cartridge examining, metal case examining, metal cup examining, steel ball examining, tile sizing, paper sorting, and print examining. The tests used had relation to visual observation, visual discrimination, diffused attention, manual dexterity, and intelligence. Quicker workers may be two or three times as fast as slow workers in the same group; hence advantage comes from knowing how to select quick and efficient workers. The capacity which determines speed and accuracy is varied and complex, and may depend on inborn ability for the conditions of work. Efficiency at inspection is a compound of speed and accuracy; it is easier to detect those who will become accurate examiners than those who may excel in speed. Quickness and accuracy do not necessarily go together; and an inverse relation between the two may occur in the same individual at different times within a spell of work; but variations in accuracy are usually less than those in speed. Both, however, seem to be manifestations of the same function; thus accuracy may improve at the cost of a reduction in

speed. No common factor appears to unite examining activity of different forms; hence examining efficiency may best be predicted by tests specifically devised for each process. A high place for general intelligence is usually present in the successful inspectors. Efficiency, however, is influenced by lighting and unusually faulty material; it is increased by changes at hourly intervals from one form of examining to another. Piece rate payment may lead to speed at the expense of accuracy; while time rates may result only in indifference and inattention. The report brings out many matters which are undoubtedly of practical importance.—E. L. C.

INDUSTRIAL SERVICE AND MUTUAL BENEFIT ASSOCIATIONS

MINERS' WELFARE FUND. TENTH ANNUAL REPORT. *H. M. Stationery Office, 1932, pp. 116.*

This report completes the second period of five years since the Welfare Fund was established, and a review of this second period is given. The Fund has been on the whole well maintained, amounting to about £1,000,000 per annum, apart from some £200,000 per annum which, since 1926, has been gathered for the purpose of erecting pithead baths. The effect upon the mining community of the activities financed by the Fund can only be fully appreciated by those who knew the British mining areas previous to 1920.

During the second period the allocations for health schemes have been much greater than during the first five years, while, in proportion, those for recreation have been less. The difference has been due mainly to sums spent on convalescent homes. Information is given as to the cost of upkeep of these homes, which shows wide divergencies, varying from 24 shillings per worker per week to 54 shillings. Allocations for education have continued to increase, particularly for persons who need assistance for completing some technical training. These cases are distinct from the scholarship scheme, which provides opportunity for selected persons to go to the universities. Among recreation schemes the development of children's playgrounds has been a definite feature of the second period.

Without doubt, the development of pithead baths has been the outstanding event. Today British pithead baths, instead of being behind other countries, are, in construction, far in advance, even though their erection has not yet provided the full amount of accommodation needed. These baths are being designed by specially retained experts, and constructed on the most economical lines. The plan adopted provides accommodation and lockers for day clothes separate from the accommodation and lockers for pit clothes, with the bathing cubicles dividing the two. Provision for getting drinking water to take below is made, and means for cleaning boots are installed. Many of the baths also have canteens attached, where refreshment can be obtained before leaving for home; these canteens always prove popular.

Among the health schemes assisted are to be noted ambulance services, and the recommendation is made that ambulances on a coal field should be

linked up into an area scheme, in order to insure an economical and more efficient service. The ten-years' life of this fund has shown what may be done by welfare organized for an industry; the future of the Fund, however, is at present uncertain, and has been referred to a special committee for advice before it becomes a fixed quantity.—E. L. C.

INDUSTRIAL HEALTH LEGISLATION: COURT DECISIONS: WORKMEN'S COMPENSATION AND INSURANCE

MINES DEPARTMENT. COAL MINES ACT, 1911. REGULATIONS AND ORDERS RELATING TO SAFETY AND HEALTH. *1932 Edition (Revised to Dec. 31, 1931). H. M. Stationery Office, 1932, pp. 184.*

This book has been brought up to date, and contains in a convenient form all Orders relating to safety and health matters in working coal mines in Great Britain. For the most part the codes of Regulations and Orders are concerned with the prevention of explosions and the right use of safety lamps. But some codes have a particular health interest, as, for example, the Regulations dealing with rescue work underground. These Regulations lay down the methods by which this work must be organized and undertaken by men who have been carefully trained and are kept on duty at central rescue stations, where approved apparatus and equipment have to be provided, such as breathing apparatus, smoke helmets and electric safety lamps. Details concerning the organization and apparatus are contained in six schedules to the code.

Another interesting code is that dealing with first aid, which sets out the accommodation that must be provided, both at the pithead and also for those working underground, so as to insure that sterilized dressings and tincture of iodine at least may always be available in case of injury. Here again details in regard to the contents of a first aid station, and also of first aid boxes for underground use are given in schedules.

One other code of medical interest is that governing the getting of ganister, in which a serious silica dust hazard is created when this rock is fractured. In this code water feed drills and water blast are mainly relied upon for minimizing the hazard.—E. L. C.

TRENDS IN STATE SAFETY REGULATIONS. *R. R. Howard. Abstr. as follows from Factory and Indust. Management, Dec., 1931, vol. 82, pp. 794–796, in Personnel Jour., April, 1932, vol. 10, pp. 435–436.*

Many examples are given to show that a new interest is developing in the prevention of industrial accidents. The safety programs developed by Wisconsin, Ohio, and Pennsylvania show decided progressive tendencies. A chart tabulation of state workmen's compensation laws, compiled by Herbert Braasch, is included.

THE AETIOLOGICAL FACTOR OF INJURY IN DISEASE. *J. Patrick. Abstr. as follows from Glasgow Med. Jour., 1931, vol. 116, pp. 321–344, in Bull. Hyg., April, 1932, vol. 7, p. 210.*

Injury is of legal importance in-

dustrially owing to the Compensation Acts. A tendency exists to accept the opinion that trauma can originate disease; this tendency is examined with reference to pneumonia, pleurisy, appendicitis, such inflammatory diseases as tuberculous lesions of joints, syphilitic arthritis, osteoarthritis, and the occurrence of innocent and malignant tumors. The conclusion is drawn that while trauma cannot always be disregarded as an etiologic factor in disease, it is of varied importance, and that, more often than not, the apparent connection between trauma and disease is not more than a chance occurrence. Particular stress is laid on the great number of injuries sustained during the war, and the few instances in which disease was established to have originated in this way. The influence of an injury in breaking down a sealed tuberculous lesion, or in admitting septic infection, is accepted and not considered to call for consideration.—E. L. C.

MINERS' NYSTAGMUS IN ENGLAND AND GERMANY AND ITS INFLUENCE ON INDUSTRIAL EFFICIENCY. *M. Bartels. Abstr. as follows from Ztschr. f. Augenh., Dec., 1931, vol. 76, p. 29, in Am. Jour. Ophth., April, 1932, vol. 15, p. 375.*

Miners' nystagmus is a typical industrial disease. In judging the degree of compensability one must be guided by the objective symptoms. The findings of the general medical examination must also be taken into account in determining a man's ability to work. A condition of all compensation should be withdrawal from underground work. To avoid immediately depriving a man of his job, it has been possible in many cases in England to relieve the disease or habituate the man to the disability by transferring him to other levels.

ON THE CONCEPTION OF CAPABILITY FOR WORK. *V. v. Weizsäcker. Abstr. as follows from Deutsch. med. Wchnschr., 1931, vol. 57, pp. 1653–1657; pp. 1696–1698, in Bull. Hyg., Jan., 1932, vol. 7, p. 19.*

This paper is a study of the attitude of mind produced either by inability to find employment or anxiety to make claims on compensation when question of incapacity arises. The point made is that capacity to work lies deep down in the will power. A man is capable of work not when he is in possession of intact organs and limbs, but when he retains the power to make them carry out their functions. It is not so much whether he wishes to work, as whether he possesses the power to wish to do so. This view makes the author discard the usual methods of assessing fatigue, such as the various ergographic and output methods, and psychoanalysis, as quite secondary to the personal opinion formed by the medical referee from close observance of the patient clinically. The moment a man gives up the battle for freedom and fights only for his rights, that is, when he looks on rights as of more worth than liberty, his vision becomes narrowed instead of widened. The same happens, too, when the urge to fight for work is objectless because there is no work to be had. In dealing with this condition, in the author's opinion, to mix the Freudian gold of analysis with the copper of suggestion is neither useful nor necessary. The whole system of

social insurance as carried out on a basis of premiums for particular injuries and a price value for every defect should be replaced by a more general insurance (*Einheitsversicherung*).

An account is given of his suggested examination of an individual case.—T. M. L.

ACTIVITIES OF SILICOSIS JOINT COMMITTEE. COUNTY OF CUMBERLAND. *Fifth Ann. Rep. Workers' Compensation Commission of New South Wales for the Year Ending June 30, 1931.*

The Silicosis Joint Committee is responsible for working the scheme which grants compensation in the county of Cumberland to men suffering from silicosis who have been employed as stonemasons, quarrymen, rock choppers, or sewer miners. During the year thirty-two men eligible for compensation were medically examined at their own desire; of these, fourteen were awarded compensation. Under this scheme men who seek employment in the industries named have to undergo a medical examination on engagement; but no periodic subsequent examination has been established. An endeavor is made to examine such selected cases as are allowed to continue in the industry at intervals of one year or six months, which is considered to be medically of great importance.

Details are given of the work of the committee since the scheme was instituted in 1927, from which it is shown that while only 0.4 per cent. of those exposed to risk at their work were in any way incapacitated after less than ten years' employment, of those employed over ten but under twenty years, 20.5 per cent. were more or less incapacitated by the lung condition; of those employed twenty years, but under thirty, 25 per cent.; of those employed for thirty years, but under forty, 43.1 per cent.; and of those who had been employed forty years or over, 58 per cent. These figures are reminiscent of those dealing with the onset of silicosis in other countries.—E. L. C.

TULARAEMIA HELD COMPENSABLE UNDER WORKMEN'S COMPENSATION ACT. *U. S. Pub. Health Rep., April 29, 1932, vol. 47, pp. 1003–1004.*

The plaintiff, an employee in a meat market, contracted tularemia in the course of his work of skinning and dressing rabbits.

The Kentucky Workmen's Compensation Act provides for compensation in the case of personal injury or death but expressly states that injury by accident does not include diseases except as "the natural and direct result of a traumatic injury by accident." Since in this case the time, place, and cause of the injury could be determined with reasonable certainty, the court of appeals ruled that the disease differed from occupational diseases of the usual type and that it did come within the scope of the Act.—T. H.

THE WORKMEN'S COMPENSATION (INDUSTRIAL DISEASES) ORDER, 1932, DATED APRIL 30, 1932, MADE BY THE SECRETARY OF STATE, EXTENDING THE PROVISIONS OF SECTION 43 OF THE WORKMEN'S COMPENSATION ACT, 1925.[1] *Reprinted from Statutory Rules and Orders, 1932, No. 314. H. M. Stationery Office, 1932, pp. 2.*

[1] The object of this order is to grant compensation during a period of fourteen days, while the workman is undergoing an operation for the removal of a localized new growth of the skin.

In pursuance of the power conferred on me by Section 43, Subsection 3, of the Workmen's Compensation Act, 1925, I hereby make the following Order:

1. Subject to the modifications hereinafter specified, the provisions of Section 43 of the Workmen's Compensation Act, 1925, shall extend and apply to the disease or injury and to the process specified in the first and second columns, respectively, of the Schedule annexed to this Order, as if the said disease or injury were included in the first column of the Third Schedule to Act, and as if the said process were set opposite to the said disease or injury in the second column of the Third Schedule to the Act.

2. This Order shall apply only to workmen employed as minders or piecers in connection with the process of cotton spinning by means of self-acting mules.

3. Compensation shall not be payable under the provisions of the said section, as applied by this Order—

a. Unless the workman shall, at least one week before the date of commencement of the disablement, have given notice in writing to the employer from whom the compensation would be recoverable, that he is applying to the Certifying Surgeon for a Certificate of Disablement, and notice personally or in writing to the Certifying Surgeon that he is applying for such a Certificate.

b. For more than fourteen days in all, unless the judge, committee, or arbitrator is satisfied that the workman is still disabled at the expiry of the fourteen days.

4. Where a workman has given to the employer the notice referred to in paragraph 3*a* of this Order, he shall, if so required by the employer, submit himself for examination by a duly qualified medical practitioner provided and paid by the employer, and, if he refuses to submit himself to such examination, or in any way obstructs the same, his right to compensation, and to take or prosecute any proceeding under the Act in relation to compensation, shall be suspended until such examination has taken place.

5. This Order may be cited as the Workmen's Compensation (Industrial Diseases) Order, 1932, and shall come into force on June 1, 1932.

SCHEDULE

DESCRIPTION OF DISEASE OR INJURY	DESCRIPTION OF PROCESS
A localized new growth of the skin, papillomatous or keratotic, due to mineral oil.	Cotton spinning by means of self-acting mules.

THE WORKMEN'S COMPENSATION (CATARACT) ORDER, 1932, DATED JUNE 3, 1932, MADE BY THE SECRETARY OF STATE, AMENDING THE WORKMEN'S COMPENSATION (INDUSTRIAL DISEASES) CONSOLIDATION ORDER, 1929, MADE UNDER SECTION 43 OF THE WORKMEN'S COMPENSATION ACT, 1925. *Reprinted from Statutory Rules and Orders, 1932, No. 424. H. M. Stationery Office, 1932, pp. 2.*

In pursuance of the power conferred on me by Section 43, Subsection 3, of the Workmen's Compensation Act, 1925, I hereby make the following Order:

1. Paragraph 3 of the Workmen's Compensation (Industrial Diseases) Consolidation Order, 1929, is hereby amended to read as follows:

3. A person suffering from cataract

shall not be entitled to compensation under the provisions of the said section on account of that disease for more than six months in all, or for more than four months unless he has undergone an operation for cataract.

Provided:

a. That where the judge, committee, or arbitrator is satisfied on the advice of the medical referee that an operation could not for medical reasons be performed within four months from the date of disablement, compensation may be continued for such further period and subject to such conditions as the judge, committee, or arbitrator may direct; and

b. That where the judge, committee, or arbitrator is satisfied on the advice of the medical referee that, having undergone an operation, the workman is still disabled by the cataract after the expiration of six months from the date of disablement, he shall be entitled to compensation so long as he remains disabled by the cataract;

But in either case without prejudice to the right of review conferred by Section 11 of the Act.

2. The item numbered 18 in the Schedule annexed to the said Order is hereby amended to read as follows:

DESCRIPTION OF DISEASE OR INJURY	DESCRIPTION OF PROCESS
18. Cataract caused by exposure to rays from molten or red hot metal.	Any process normally involving exposure to rays from molten or red hot metal in the manufacture of iron or steel, including reheating and rolling iron or steel.

3. This Order may be cited as the Workmen's Compensation (Cataract) Order, 1932.

THE POTTERY (SILICOSIS) REGULATIONS, 1932, DATED MAY 24, 1932, MADE BY THE SECRETARY OF STATE UNDER SECTION 79 OF THE FACTORY AND WORKSHOP ACT, 1901. *Reprinted from Statutory Rules and Orders, 1932, No. 393. H. M. Stationery Office, 1932, pp. 4.*

In pursuance of Section 79 of the Factory and Workshop Act, 1901, I hereby make the following Regulations and direct that they shall apply to all factories and workshops in which the manufacture or decoration of pottery, or any process incidental thereto is carried on, including all factories and workshops in which flint is ground for use in the manufacture of pottery, in addition to the Regulations for the Manufacture and Decoration of Pottery made on Jan. 2, 1913, hereinafter referred to as the Principal Code.

Provided that, if it can be shown, in respect of any factory or workshop, that hardship would be caused by requiring immediate compliance with the requirements of the Principal Code as applied by this Code in regard to the provision of messroom and lavatory accommodation or in regard to provision of exhaust ventilation for fettling of ware other than flatware, the Chief Inspector of Factories shall have power by certificate in writing, and subject to such conditions as he may think fit, to allow such time for compliance as he may in the particular circumstances consider reasonable.

These Regulations may be cited as the Pottery (Silicosis) Regulations, 1932, and shall come into force on

July 1, 1932. As from the said date the following parts of Regulations of the Principal Code shall so far as respects factories and workshops to which these Regulations apply, be revoked:

So much of Regulations 2 and 3 as relates to the periodic medical examination of persons employed in processes included in Part II of the Schedule.

Regulation 7*a*, paragraphs i, ii, iii, and vii.

Regulation 7*f*.

So much of paragraph ii of Regulation 12*b* as relates to the cleaning of the floors of *potters' shops*.

So much of Regulation 12*c* as relates to the cleaning of the floors of china biscuit placing shops.

For the purposes of these Regulations, "*Pottery*" means the manufacture of china and earthenware, including sanitary earthenware, electrical earthenware, and earthenware tiles, but otherwise the terms in these Regulations have the same meaning as in the Principal Code.

Duties

It shall be the duty of the occupier to observe Part I of these Regulations.

It shall be the duty of every person employed to observe Part II of these Regulations.

PART I

Duties of Occupiers

1. No young person shall be employed in the carrying of clay scraps, except scraps of his own making, or scraps from the making of articles from clay dust by pressure.

2. The provisions of the Principal Code relating to overalls and head coverings (Regulation 4), outdoor clothing (Regulation 5), food (Regulation 6, excepting paragraph *l*), and lavatories (Regulation 11), shall apply to the following processes:

a. The crushing, grinding, sieving, or manipulation of calcined flint preparatory to flint milling;

b. All processes involving exposure to powdered flint, except that head coverings need not be worn by biscuit placers.

3. The following processes shall not be carried on without the use of an *efficient exhaust draft:*

i. The sieving of material drawn from the calcining kiln after the calcining of flint;

ii. The crushing or grinding of flint in a stone crusher or grinding machine, unless the machine is provided, and kept provided, with an efficient water or steam spray or other arrangement to prevent the escape of dust into the air;

iii. The fettling of ware by towing or sandpapering;

iv. Any other process of fettling flatware except (*a*) where the fettling is done wholly with a wet sponge or other moist material, or (*b*) where the fettling is done while the articles are still so damp that no dust is given off.

v. The fettling of ware (other than flatware) on a wheel driven by mechanical power, unless the articles to be fettled are so damp that no dust is given off;

vi. Placing of ware with the use of powdered flint for the biscuit firing;

vii. If powdered flint has been used in the placing of the ware for the biscuit firing—

a. Emptying such ware from the baskets or other receptacles in which it

has been conveyed to the biscuit warehouse or scouring shop, unless such emptying is carried on in a room or portion of a room provided with efficient general mechanical ventilation applied at a suitable level;

b. The filling or emptying of "cradles" or other receptacles used as containers of the ware in the scouring machine;

viii. Polishing with the use of flint, and grinding on a dry sandstone wheel;

ix. Sorting of glost ware with a power driven tool;

x. Grinding of tiles on a power driven wheel in connection with tile slabbing, unless an efficient water spray is used on the wheel.

4. If powdered flint has been used in the placing of the biscuit ware, such ware shall not be removed from the saggers after firing, except at a bench fitted with an *efficient exhaust draft.*

5. All chutes, conveyors, elevators, screens, sieves, and mixers used for manipulating materials containing flint so dry as to produce dust shall be enclosed and provided with an *efficient exhaust draft.*

6. Dust discharged from exhaust fans used in connection with a manufacturing process shall be collected in a suitable apparatus and not allowed to escape into the air, provided that this Regulation shall not apply to the processes specified in Regulation 3, paragraphs viii, ix, and x, or to the brushing of earthenware biscuit ware, except where required in writing by the Inspector of Factories for the district.

7. All practicable means shall be taken, by damping or otherwise, to prevent dust from arising during the handling of shraff or other waste material.

8. The floors of *potters' shops*, including the floors of such drying stoves as are entered by workpeople, shall, if constructed or reconstructed after the date of these Regulations, be impervious.

9. Suitable shelves or other accommodation shall be provided for molds in use in *potters' shops.* In no case shall molds be left on the floor during the night.

10*a*. When the rooms are in use the floors of *potters' shops* and *scouring shops* shall be thoroughly cleaned daily, by a moist method, by an adult male after work has ceased for the day, and before 3 A.M. next morning. Damp sawdust or other suitable material shall be used to render the moist method effective in preventing dust from rising into the air during the cleaning process.

b. The floors of china biscuit placing shops shall be cleaned by an adult male in the manner prescribed by this Regulation whenever the work of setting in an oven has ceased, and, in any circumstances, at least once a day.

c. Efficient dry cleaning by means of a vacuum cleaner may be substituted, wherever practicable, for the moist cleaning prescribed by this Regulation, and such cleaning may, with the written approval of the Inspector of Factories for the district, be carried out during working hours.

PART II

Duties of Persons Employed

11. The provisions in Regulations 30 (overalls, etc.), 31 (food) except paragraph (*b*), 32 (ventilation—dust), 33

(washing), 34 (cleaning of work places), and 36 (avoidance of dust, etc.), in Part II of the Principal Code as to the duties of persons employed, shall apply to persons employed in the processes of—

a. The crushing, grinding, sieving or manipulation of calcined flint preparatory to flint milling:

b. All processes involving exposure to powdered flint.

12. Workers using molds in *potters' shops* shall keep these molds in the place provided, and shall not leave any moulds on the floors at night.

WORKMEN'S COMPENSATION PROBLEMS. *V. A. Zimmer. Arch. Ophth., March, 1932, vol. 7, p. 367.*

THE DOCTOR AND THE INDUSTRIAL COMMISSION. *O. F. McShane. California and Western Med., Feb., 1932, vol. 36, p. 97.*

INDUSTRIAL MORTALITY AND MORBIDITY STATISTICS

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES IN THE THIRD QUARTER OF 1931. *D. K. Brundage. U. S. Pub. Health Rep., Jan. 15, 1932, vol. 47, pp. 134–135.*

The frequency of sickness causing disability for more than one week was 2 per cent. lower in the third quarter of 1931 than in the same quarter of 1930, and 15 per cent. below the incidence rate for the corresponding period of 1929. The frequency of nonindustrial injuries, however, was somewhat higher during the recent quarter-year than in the same period of either of the two preceding years, presumably on account of the longer time that men are exposed to accidents outside the factory, as they spend fewer hours in it.

For respiratory diseases as a group the decrease was 8 per cent. from the 1930 to the 1931 period, and 25 per cent. from 1929 to 1930. Yet each of the three periods under review is regarded as epidemic free.

Among the respiratory diseases, pneumonia (all forms) exhibited the most spectacular decrease, the rate for the third quarter of 1931 being less than half of what it was in the same period of 1929. Influenza was reported at a slightly lower rate during the recent quarter than in the third quarter of 1930, but at a much lower rate than in the corresponding quarter of 1929. Bronchitis, tonsillitis, and other diseases of the pharynx and tonsils show a decrease in frequency of about 10 per cent. from the 1930 to the 1931 period, and approximately 20 per cent. from the 1929 to the 1930 quarter-year under consideration. The rate of new cases of respiratory tuberculosis appears to be about the same as in 1930, but lower than in 1929.

Nonrespiratory diseases as a whole occurred at virtually the same rate in the third quarter of 1931 as in the third quarter of 1930. The latter rate, however, was 7 per cent. below that of the third quarter of 1929.

In the nonrespiratory group, certain disease categories have shown consistent improvement up to the end of the third quarter in 1931 over the corresponding rates in 1930 and 1929. These diseases or disease groups are appendicitis, diseases of the skin, rheumatism, and "other digestive diseases," which include, principally, diseases of the

mouth and annexa, the intestines, and the liver. For diseases of the stomach, and diarrhea and enteritis (considered as one group), the rates exhibit evidence of a declining trend, but the improvement has not been as consistent as in the other disease groups mentioned.

In addition to nonindustrial injuries, at least two disease groups appear to be resisting the declining trend of sickness—neurasthenia and "other genito-urinary diseases."

SICKNESS AMONG MALE INDUSTRIAL EMPLOYEES DURING THE LAST THREE MONTHS OF 1931, AND A SUMMARY OF SICKNESS FREQUENCY BY YEARS SINCE 1920. *D. K. Brundage. U. S. Pub. Health Rep., April 29, 1932, vol. 47, pp. 995–1001.*

Final Quarter of 1931.—There was a small decrease in the frequency of disabling sickness during the last three months of 1931 as compared with the rate in the same quarter of 1930, and a substantial decrease (17 per cent.) as compared with the same quarter of 1929. The frequency of nonindustrial accidents, as in the two preceding quarters of the year, was greater than in the corresponding period of either of the two earlier years.

The respiratory disease rate was slightly lower than in the last quarter of 1930, and considerably below the 1929 incidence. Respiratory diseases which decreased in frequency were influenza or grip, bronchitis (acute and chronic), pneumonia (all forms), and tuberculosis of the lungs.

For nonrespiratory diseases as a whole, a decrease of about 5 per cent. is indicated as compared with the rate for either one of the two earlier periods. The numerically important diseases of the digestive system show no significant decrease. Rheumatism and diseases of the skin, however, have shown dwindling incidence rates throughout the year as compared with the corresponding periods of 1930 and 1929. The only disease category (with the exception of ill-defined and unknown causes) showing a higher rate in the last quarter of 1931 than in the same quarter of either of the two preceding years is neurasthenia, the rate for which has been consistently higher since April, 1931.

Year 1931 as a Whole Compared with Preceding Years.—The frequency of cases of disabling sickness of eight days and longer was slightly higher than in 1930, but still 5 or 10 per cent. below the average rate for the ten preceding years, depending on whether all reporting establishments or only those reporting throughout the eleven years are considered. Respiratory diseases as a whole decreased from the ten-year average relatively more than did total sickness. No year of record shows a lower rate of sickness exclusive of influenza than occurred in 1931. For nonrespiratory diseases as a group, the rate was slightly below the average for the ten preceding years.

A remarkable decrease is indicated for diseases of the upper respiratory tract, especially for bronchitis and for diseases of the pharynx and tonsils, the rates for these diseases as well as for "other diseases of the respiratory system" being below the frequency for any of the ten preceding years.

The rate for digestive diseases as a whole was below the average for the ten preceding years; the most notable decrease as compared either with 1930

or with the ten-year average was recorded for diseases of the stomach (except cancer). The rates for diarrhea and enteritis also were favorable. Appendicitis was reported at exactly the average incidence for the ten preceding years, and cases of hernia were more numerous. For "other diseases of the digestive system" the 1931 rate was also relatively high.

The incidence rate of nonrespiratory, nondigestive diseases was below the annual average frequency from 1921 to 1930, but within this group certain subgroups, such as certain diseases of the circulatory system, especially diseases of the heart, diseases of the genito-urinary system and annexa (except nephritis), and diseases of the nervous system, showed rates in excess of the ten-year average.

Attention should be called to the decrease in the frequency of rheumatism (acute and chronic), diseases of the skin, and the epidemic and endemic disease group exclusive of influenza.

CENTRAL MINING—RAND MINES GROUP. SANITATION DEPARTMENT. REPORT FOR THE YEAR 1931. *A. J. Orenstein. Johannesburg, 1932.*

This report deals with a large body of native labor, comprising some 80,000 persons, whose life is so controlled that observations can be made upon the efficacy of treatment when tried out on a large scale. The report is restrained, merely presenting details of morbidity rates and death rates. Of particular interest is the incidence of pneumonia among two large groups of natives. In 1928 both groups were submitted to inoculation against pneumonia, and the incidence rate of the disease was practically coincident in the two groups, being 38.4 per thousand and 39.7, respectively. In the following two years one group received no inoculation, but the incidence in that group became considerably lower than in the other, and lower than it had been for that group in 1928; the figures in 1929 were 27 per thousand in the uninoculated group, and 32.9 in the inoculated group, and in 1930, 35.6 in the uninoculated, and 42.1 in the inoculated group. Then followed the year 1931, when inoculation was stopped for both groups; the incidence fell particularly for the inoculated group, and was 32.9 for the group which had not previously been inoculated, and 34.4 for the other group. Thus evidence is consistently against inoculation as of value in the prevention of pneumonia.

Miners' phthisis, or silicosis, is not prevalent among native Rand miners, owing to their short stay at the mines; nevertheless, improved mining conditions are lowering the incidence of this disease, which was 0.1 per thousand in 1929 and 0.05 in 1931. Case mortality fell from 6.8 to 5.3. Some reduction is reported in the accident rate, which, nevertheless, still remains high at a death rate of 2.98 per thousand. Particular attention is being paid to the diet of the natives, which is entirely under control. Underweight natives reacted favorably to the issue of extra rations of meat. An experiment is being carried out of issuing vitaminized monkey-nut oil in the diet. Hookworm infection was discovered in the mines in 1927; in 1928, 217 new cases were reported; prophylactic measures reduced this number to 48 in 1931. References are made to several

new lines of observation which are being developed, and interest will attach to the results when they are made known in later annual reports.—E. L. C.

THE EFFECT OF LABOR ON MAN AS JUDGED BY SHORT HOURS AND UNEMPLOYMENT. *L. Ascher. Abstr. as follows from Zentralbl. f. Gewerbehyg., Dec., 1931, N. S. vol. 8, pp. 297–301, in Bull. Hyg., April, 1932, vol. 7 p. 210.*

The author claims that as the result of rationalization and mechanization of industry, mortality statistics have largely lost their value and that recourse must be had to individual morbidity figures. In this connection records of sickness frequency and its duration are extremely valuable. By means of special sickness cards in use by sick benefit societies for about a year, an average duration of incapacity from various ailments was struck for about 5,000 occupied persons. With these he compares 329 persons on short hours (twenty-four hours a week in contrast to the usual forty-eight). To his surprise the percentage diminution in the number of sick days averaged 95 for practically all the usual disease—influenza, tonsillitis, tuberculosis, rheumatism, injuries, and nervous, bronchial, digestive, and circulatory diseases. Similarly employing a modification of the method in the case of persons employed and unemployed, the percentage diminution in cases of sickness distributed according to age groups was about 60 in favor of the unemployed, notwithstanding the diminished income. This was particularly noticeable for influenza and tonsillitis from absence of risk of "catching colds" as well as for injuries the cause for which was obvious. But even in regard to tuberculosis the same result holds good.

He considers that he has shown for the first time how great is the influence of hours of work per week on sickness rates, as never before probably have such great differences as forty-eight and twenty-four hours affected so many workers.—T. M. L.

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